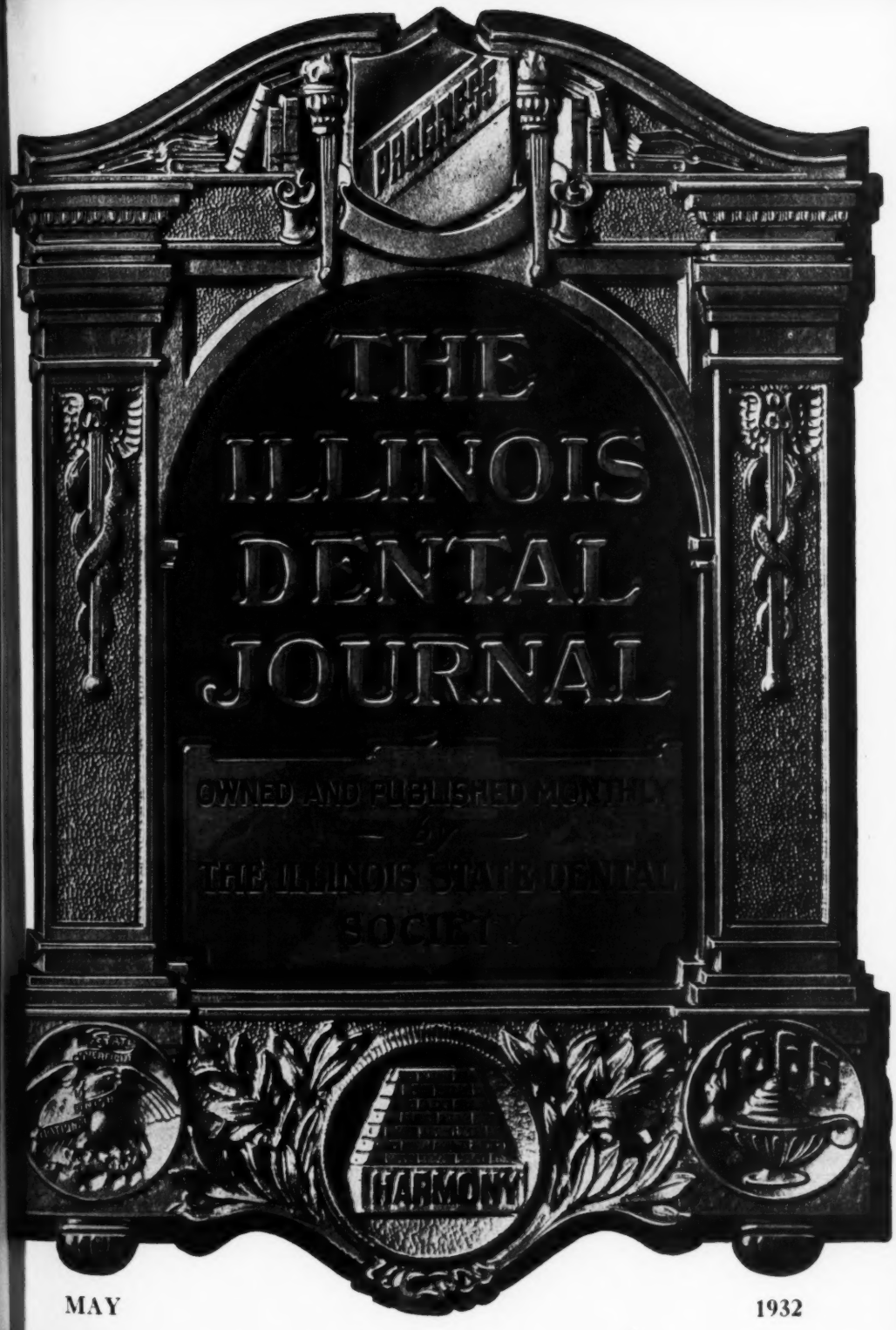
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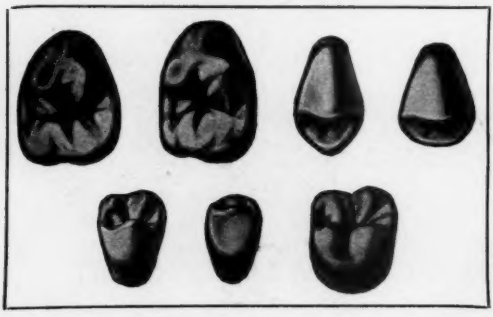

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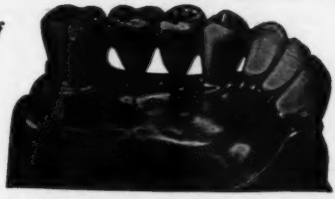

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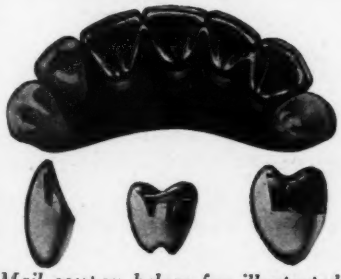

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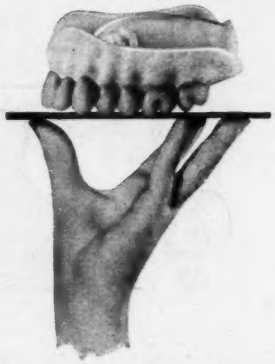

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THE ILLINOIS DENTAL JOURNAL

Volume I May, 1932 Number 9

THE TREATMENT OF DEEP DENTAL CARIES*†

By EDGAR D. COOLIDGE, M.S., D.D.S., F.A.C.D., *Chicago, Illinois*

THE problem of the pulpless tooth in relation to general health has confronted the profession very persistently during the past two decades. The difficulty of establishing any satisfying proof that all people can tolerate pulpless teeth even though there is no radiographic evidence of pathologic changes has forced upon our profession an additional stimulus to retain as many living pulps as possible.

The problem involved in saving pulps where decay has penetrated deeply into the dentin requires much study and thought. *First* one should consider the beginning and progress of dental caries with relation of pulp reaction that occurs as a result of this infection of the dentin. *Secondly* the relation of these pulp changes to its vitality must be understood and a very careful diagnosis made in each case presenting so as to apply treatment only in the favorable cases. *Thirdly* the question of pulp reaction to attempts to cover by pulp capping methods, actual exposures of a small portion of the pulp.

In his research upon the enamel and dentin, Fish[1] has observed and demonstrated the circulation of lymph through the dentin and into the enamel in normal conditions. The channel through which this ebb and flow circulation finds its way is shown to be along the dentinal tubules in which the Tomes fibers lie but between them and the wall of the tubule. He has shown that this circulating fluid will carry particles of insoluble Indian ink into the center of the dentin and with methylen blue has demonstrated the penetration of the dye throughout the dentinal tubules and into the prism sheathe of the enamel of dogs.

When the dentin is exposed to external irritating influences through leaks in defective enamel or by the loss of covering from caries or mechanical causes the dentinal tubules thus uncovered lose their circulating fluid by coagulation or decomposition. This leaves a tract of dentinal tubules extending to the pulp having no circulation which at once becomes a dead tract.[2] The pulp underlying the dead tract at once begins to lay down secondary dentin to wall off this

†Note: Read before Section III Pathology & Therapeutics, VIII International Dental Congress, Paris, August, 1931, and published in the transactions of the Congress. Read before the Peoria District Dental Society, March, 1932. Republished by permission.

*From the Research Department (Director Rudolf Kronfeld) of the Chicago College of Dental Surgery, Dental Department of Loyola University.

1. Fish, E. W. Circulation of Lymph in the Dental Tubules, with some Observations on the Metabolism of the Dentin. Proceedings of Royal Society of Medicine, 1926, Vol. 19, Soc. of Odontology.
Fish, E. W. The Circulation of Lymph in Dentin and Enamel. Jour. Amer. Dental Assn., May, 1927.
Fish, E. W. A Physiological Survey of the Nature of Enamel in Carnivora and Primates. Dental Record, London, June, 1928.

2. Fish. E. W. The Physiology of Dentin and Its Reaction to Injury and Disease. British Dental Journal, June, 1928.

part of the dentin from its contact with the pulp thus protecting itself from the ingress of poisonous products from the tubules in the dead tract. This conception of the deposit of secondary dentin differs from the conception of its being stimulated by continuous irritation for a period long enough for the pulp to lay down the barrier of secondary deposit which reduces the irritation by virtue of containing less dentinal tubules. If irritation ceases because of the coagulation of tubular protoplasm and lymph soon after exposure of the tubules the formation of secondary dentin would appear to be a result of some other factor than continued irritation.

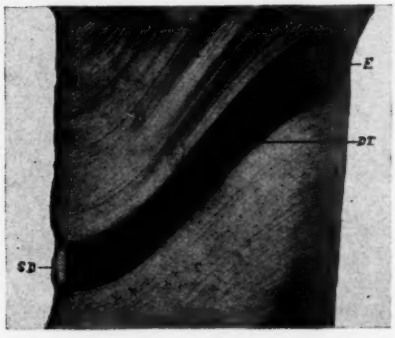

Fig. 1. Unstained ground section of human tooth. E, erosion at cemento-enamel junction. DT, dead tract (Fish) in the dentin. SD, secondary dentin on wall of pulp chamber covering ends of tubules contained in the dead tract caused by exposure.

Bodecker[3] attributes the reduced sensitiveness to the plugging of some dentinal tubules by deposits of secondary dentin which itself contains less tubules than primary dentin.

3. Bödecker, Chas. F., Dental Histology & Embryology, MacMillan, 1926 ed. p. 98.
Bödecker, Chas. F., A Consideration of Some of the Changes in the Teeth from Youth to Old Age, Dental Cosmos, June, 1925.

Fig. 1 and 2 illustrate dead tracts in the dentin of human teeth which can easily be traced from the surface of the dentin to the pulpal wall and an area of secondary dentin appears just covering all the affected tubules and no more. Thus it is that the defensive mechanism of the pulp is at once set to work in an effort to ward off irritating influences

Fig. 2. Decalcified and stained section of biscupid. C, shallow caries at cemento-enamel junction. SD, secondary dentin covering pulpal ends of dentinal tubules contained in dead tract caused by caries. P, pulp. OD, odontoblasts.

that would produce more serious pathologic changes in the pulp. In Fig. 1 the commonly exposed dentin at the cemento-enamel junction where the thin covering of cementum has been lost has permitted the contact of external irritants to destroy the circulation in the underlying tubules. This creates the so-called "dead tract" in the dentin which is being walled off by the pulp with secondary dentin. The dead tract shown in Fig. 2 was caused by beginning caries in the dentin and the exact area has been walled off from the pulp by a thick layer of secondary dentin. It is interesting to notice the absence of odontoblasts along the inner surface of the secondary dentin. The formation of the beginning deposit

of dentin has been shown by Orban,[4] Ebner, Korpf and others to be independent of the odontoblasts.

The difference between these two conditions shown, according to Fish[2] is that the simple exposure of dentin as shown in Fig. 1 causes no further pulp disturbance unless the dead area undergoes putrefaction within the tubules thus developing typical decay. In Fig. 2 the process of decay has already begun, and unless checked by cavity preparation and filling will spread not only toward the pulp, but laterally by means of the anastomosing branches of the dentinal tubules and the interglobular spaces, until so many tubules are involved and infected that the pulp is unable to produce the new calcified barrier fast enough to protect itself from poisonous products of tubule decomposition. This results in an inflammatory reaction in the pulp accompanied by the common symptoms of pulpitis.

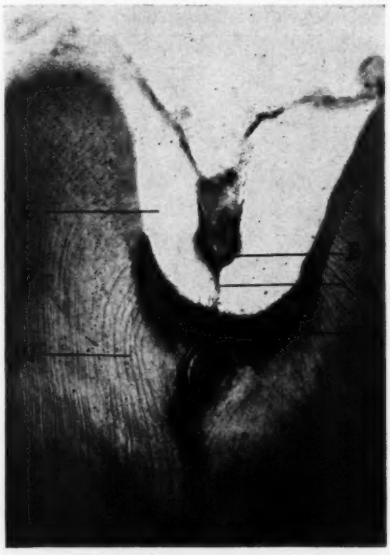

Fig. 3. Caries in an occlusal fissure of a molar of a white rat, decalcified section. D, dentin. E, space formerly occupied by enamel. BP, bottom of the occlusal pit (pit filled with debris). L, enamel lamella. D_1, caries of the dentin. DT, infected dentinal tubuli. Barker, J. A. D. A., Jan. 1931.

The rapid lateral spreading of caries has been often illustrated. Barker[5] gives a very good illustration of this in an occlusal pit cavity, Fig. 3 where the leak through the enamel occurred by way of an enamel lamella which is only microscopic in diameter.

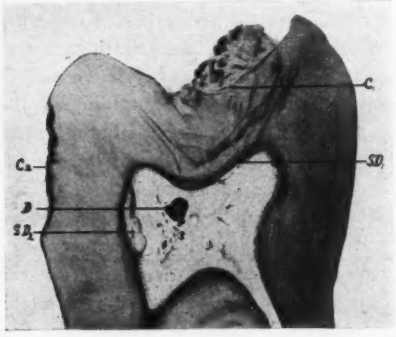

Fig. 4. Occlusal and approximal caries in a molar crown. C_1, occlusal caries, C_2, approximal caries, SD_1, secondary dentin corresponding to C_1, SD_2, secondary dentin corresponding to C_2. D, denticle.

A bicuspid with two carious tracts closed off from the pulp is found in Fig. 4. Both of these areas of caries are shallow, and yet well formed layers of secondary dentin have already walled off the dead tracts from the pulp. There has been no serious damage done to the

4. Orban, B., The Development of the Dentin, J. A. D. A., Sept., 1929.

5. Barker, F. J., Importance of Normal and Abnormal Tooth Structure in the Process of Dental Caries, J. A. D. A., Jan., 1931.

pulp during this reaction. From a clinical standpoint these deposits of secondary dentin are a great aid in safeguarding the pulp from exposure during cavity preparation.

When the occlusal surface or incisal edge of a tooth is worn down by abrasion exposing some of the dentinal aubules, it will generally be found upon histological examination that a protective layer of secondary dentin has been interposed between the pulp and the dead tract of dentin. Dentinal tubules, exposed by slowly progressing causes, do not as a rule become susceptible to a decomposition of their organic content as occurs in dental caries. In case of a sudden fracture exposing numerous tubules to mouth fluids an inward percolation of irritating mouth fluids and bacterial matter may occur and usually does before the pulp is able to protect itself by sealing off the exposed tubules with secondary dentin. This inflow into the pulp through suddenly exposed live tubules causes the death of the pulp, unless the exposed ends of the tubules are promptly disinfected and covered artificially, until the pulp has had time to react against the dead tract. This type of pulp reaction is purely physiologic in its nature. In the case of fracture when artificial covering is provided the normal reaction may occur, as in the slow progressive uncovering by abrasion or erosion.

The condition shown in Fig. 5 illustrates the reaction of the pulp during abrasion with a later occurrence of caries on both approximating surfaces. There appears to have been an early deposit of secondary dentin in the coronal third of the pulp chamber where abrasion exposed the tubules. A later deposit was formed on each lateral wall covering the tubules, whose living tissue was destroyed by exposure to mouth fluids by carries. In these tubules carious decomposition followed. It is very evident that two entirely different results are found to exist. One where no decomposition takes place in the dead tract, and the other where there is a continuous progress and spreading of the decomposition of organic matter in the tubular dentin, which approaches closer and closer to the protective layer of new calcified substance. Even this barrier will eventually succumb to the destructive influence of bacteria and their products if not controlled by surgical treatment in the form of cavity preparation.

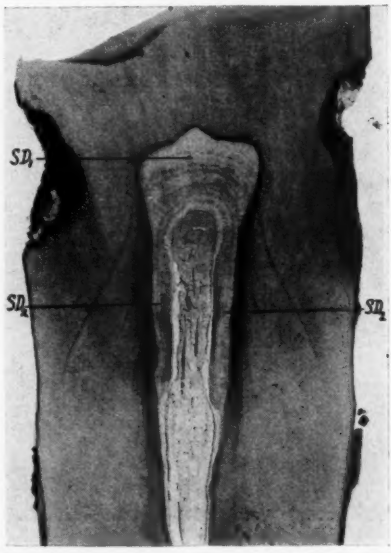

Fig. 5. Lower central incisor abrasion, mesial and distal caries. SD_1, secondary dentin in coronal third of pulp chamber in response to abrasion. SD_2, later deposit of secondary dentin in response to mesial and distal caries.

Two extreme cases of dental caries are shown in Figs. 6, 7 and 8. In both cases the original pulp chamber wall has been penetrated by the infection and yet the pulp itself has suffered very little harm. In Figs. 6 and 7 the pulp appears in a reasonably healthy condition

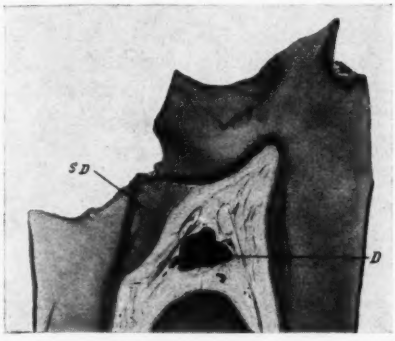

Fig. 6. Extensive caries in lower molar. SD, secondary dentin in corner of pulp chamber in response to an earlier stage of caries which has protected the pulp from exposure. D, denticle.

although a large denticle and several smaller ones lie in the center of the pulp. It is interesting to note the remaining horn of the pulp which is just beginning to lay down the calcium barrier to wall off the dead tract of dentin caused by the new decay above it. This action is an evidence that the widely diseased area of dentin on the opposite side was so well walled off from the pulp that no serious damage resulted to the pulp. In the higher magnification of Fig. 7, the layer of pulp showing immediately beneath the secondary dentin is in very good condition even though the infection is just beginning to enter the outer border of secondary dentin. The denticles may perhaps represent the effect of the stimulus to produce calcifications within the pulp which are commonly considered as calcific degeneration, but the vitality of the organ from a clinical standpoint is still high. In Fig. 8 more serious pulp changes are in evidence. The blood vessels are quite large and areas of infiltration appear along the outer border where the infection is already percolating through the layer of secondary dentin. This pulp would no doubt have undergone inflammatory changes if an attempt had been made to remove the decay and save the pulp by filling or crowning.

The Treatment of Dental Caries

In the preparation of cavities for filling it is well known that the softened area of dentin is without sensation, but the dentin surrounding these areas is usually exceedingly sensitive. This is explained by Fish[6] in the following man-

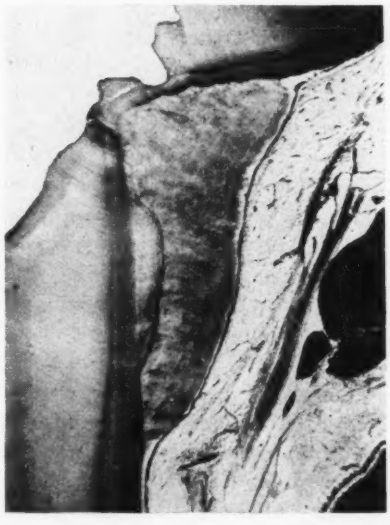

Fig. 7. Higher magnification of SD of Fig. 6. Pulp tissue shows only slight inflammatory changes.

6. Fish, E. W., The Clinical Application of Some Recent Research Work on the Dentine, Birmingham Med. Rev., May, 1930.
Fish, E. W., A Resume of Recent Research Work on the Dentine, Jaargang 37 Afl. 3, Maart, 1930.

ner: dead tracts carry no sensation but the tubules in the approximating dentin contain living protoplasm, lymph, and Tomes fibers. The anastomosing tubules carry the infection into new tubules, which is resisted by an effort of the odontoblasts to lay down calcium salts in these tubules to wall off the infection. As soon as they become coagulated or calcified there is no further sensation in them; but in cutting the walls in cavity preparation new uncalcified tubules are opened up which have a high degree of sensitiveness.

It has been shown that dental caries spreads rapidly after reaching the dentino-enamel junction and interglobular spaces.[5] In the process of cavity preparation the walls of the cavity should be extended well into the sound dentin to an area beyond the lateral spreading of the carious process. The floor of the cavity must lie in sound undecomposed dentin. It is apparent from such conditions as appear in Figs. 2, 3, 4 and 5 where the softened dentin is quite shallow but the dead area extends to the secondary dentin that it would not be necessary nor wise to attempt to remove all of such areas. Since the pulp has already protected itself from the existing condition all that remains to be done is to lay the pulpal wall of the cavity well below the softened dentin, even though in so doing the wall makes a cross section of the dead but unsoftened tubules.

After saturating such dead tubules with a good germicide the cavity may be safely filled. The germicide to be used should be one which will penetrate into the dead tract rather than to cauterize the surface only. Water soluble solutions were considered as most efficient by the late Willoughby Miller[7] in 1891 whose contribution to our knowledge of the pathology of dental caries was monumental. His conclusion was that phenol placed in the cavity and protected from the saliva for one-half hour was most suitable for this purpose. The same is recommended by Fish in his articles. The Dakin chlorin solutions deserve to be mentioned also in this connection. The author has used a 4% solution of chloramin T for this purpose with considerable assurance of its efficiency but he has no experimental evidence to offer as proof.

The success of the control of the dead tract of dentin which possibly contains bacteria depends upon the hermetical sealing of the cavity by the filling material from all leaks rather than upon medication. After the cavity has been carefully sterilized and accurately filled, the dead area of dentin beneath the filling is sealed off from the mouth fluids by the filling and from the pulp by secondary dentin, and is therefore inert and harmless. Lateral spreading is controlled by two factors: first the bacteria have no suitable medium in which to grow; secondly there may be a calcification of the lymph in the surrounding tubules, which soon walls off such an area from its collateral union.

Cavity preparation in such cases as found in Figs. 6 and 8 would undoubtedly involve the pulp and necessitate its removal, thus eliminating these teeth from our present consideration.

7. Miller, W. D., Comparative Rapidity with Which Different Antiseptics Penetrate Decalcified Dentin, or What Antiseptics Should Be Used for Sterilizing Cavities Before Filling, Cosmos 33:337, May, 1891.

A cavity had been prepared and filled in the molar tooth found in Fig. 9 several years before its extraction. The floor of the cavity crosses one pulp horn which had been filled in with secondary dentin previously so that no pulp exposure was made by the preparation. There is no evidence of any damage to the underlying pulp tissue from the process of cavity preparation, nor from the

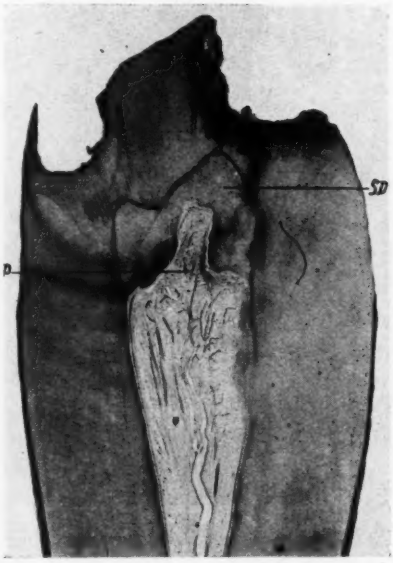

Fig. 8. Lower biscuspid with mesial and distal caries. SD, secondary dentin protecting pulp from extensive caries. The infected area of dentin has arrived at the border of secondary dentin. P, congested blood vessels and beginning inflammation in the pulp.

presence in the cavity of a filling, even though it was a large and deep seated amalgam filling. A fresh decay lower down on the opposite surface has produced the normal pulp response in walling off the dead tract of dentin. It is a perfect seal of all infected tubules and represents a third pulp response to injury and infection. No history is known of the method of treating the cavity before the filling was inserted. The only conclusion to be made is, that whatever method of treatment was employed, or possibly none at all, proved successful. It shows that there is a remarkable defensive reaction in pulp tissue.

A typical cavity preparation is found in Fig. 10. On the pulpal wall two layers of secondary dentin are in evidence. The first one covered the dead

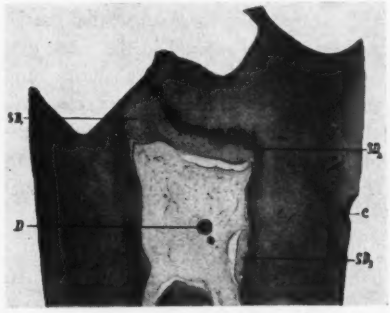

Fig. 9. Lower molar showing prepared cavity in which amalgam filling had been carried for several years. SD_1, secondary dentin filling mesial pulp horn crossed by floor of cavity. SD_2, secondary dentin corresponding to occlusal part of cavity. $SD_{2\,1}$, smaller area of secondary dentin corresponding to shallow cervical caries, C, on distal surface. Empty spaces along pulpal walls are due to shrinkage during preparation. D, denticle (Willman).

tract of dentin caused by exposure in caries, while after cavity preparation, another later deposit was laid down over the newly cut dentinal tubules and was continued over the previous deposit of secondary dentin. This represents a very desirable result. The only unsatisfactory condition is the evidence of a

leak at the gingival margin of the cavity and a new area of decomposition is beginning to form. The condition of the pulp tissue seems to be favorable to the comfort and health of the indiyidual and its presence in the tooth is to be desired under these conditions.

DEEP CARIES AND PULP EXPOSURE

It is not always possible to determine clinically just how close to the pulp caries has progressed, because there is no way of determining how thick a layer of secondary dentin has been interposed between the pulp and the primary dentin. It is reasonable to assume that caries progresses more rapidly in the tooth of a young individual than in an adult, and the time for building new secondary dentin would therefore be shorter in the young than in the old. Hence *the greatest demand for treatment of deep caries is usually found in young patients.*

The thing that nature needs most is a chance to perform its own defense in its own way. Careful excavation with as little injury to highly sensitive, living tubular protoplasm is of the greatest importance. Extensive cutting of an extremely sensitive area in a young patient often destroys so many new tubular contents that the burden upon the pulp is increased beyond its limit; while if the softened decay is removed and the dentin disinfected with phenol or a Dakin solution and then sealed with cement for a few weeks, the cavity can be prepared later for permanent filling with less pain and danger to the vitality of the pulp. The use of local anesthetics for controlling pain in cavity preparation should be looked upon as a necessity only in exceptional cases.

When the removal of the softened dentin nearly exposes the pulp, it has been considered good practice by most American writers to protect the pulp by placing a thin layer of some mild non-irritating substance in the cavity after disinfection. The materials used for this purpose are the same as those used in

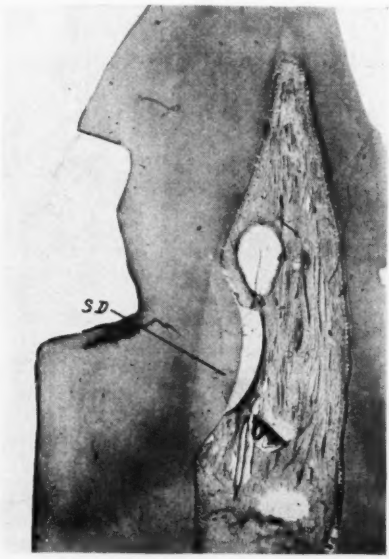

Fig. 10. *Lower cuspid that carried a filling for several years SD, secondary dentin corresponding to all dentinal tubules severed in cavity preparation* (*Willman*).

pulp capping and act principally as an insulation between the filling material and the pulp to reduce thermal irritation. Howe[8] recommends placing a thin layer of zinc oxide mixed into a paste with eugenol over all nearly exposed pulps. He also recommends the reduction of silver over this in some cases and the in-

8. Howe, Percy R., The Conservation of the Dental Pulp, Dental Items of Interest, Vol. 4, Dec., 1919.

corporation of a crystal of silver nitrate in others. He reports over 880 cases treated by these methods at the Forsyth Infirmary. The report does not state how many of these pulps were actually exposed at the time the treatment was given. The same treatment is recommended by Marshall.[9]

Grove[10] emphasizes the importance of keeping the pulp alive, even if necessary to leave a layer of decayed dentin over the pulp where the root end has not fully developed. Certainly every effort should be made to retain the vitality of a pulp until the root has completely formed, and clinical practice will verify the success of pulp capping by the completion of root development in many cases of severe exposure of the pulp in children's teeth. He recommends using a stiff paste made by liquefying equal parts of hydrated chloral and thymol in a warm mortar and then mixing this with zinc oxide to place directly over the pulp and a covering of white copper cement over it. It would seem better practice to remove all soft decay in all cases. After the removal of soft decay there is still enough danger of pulp infection from infected tubules in the dentin lying over the pulp.

Warner[11] and Netherton and French[12] recommend a mixture which they call "Sedative Cement" for pulp capping. The formula contains Eugenic acid (eugenol), thymol iodid, bismuth subnitrate, and zinc oxide. Warner gives credit to R. G. Gardenier for the development of the formula.

Best[13] claims excellent results from the use of a mixture of zinc, magnesia, silver nitrate powder and eugenol. The proportion of the ingredients is not given, but the mixture is used in a thick pasty consistency. This is covered with oxychloride of zinc cement.

Barker[14] reported 800 cases of pulp capping in deciduous teeth using Howe's ammoniacal silver nitrate treatment followed with a filling of copper amalgam or copper cement. These cases extended over a period of three years. The work was done in the dental clinic of the Denver public schools.

Buckley[15] recommends thymolized calcium phosphate mixed with oil of cloves or eugenol. The preparation consists of 10 grains of thymol to each ounce of precipitated and purified calcium phosphate. A later preparation by the name of Dentinoid is a combination of thymolized calcium phosphate with bismuth subnitrate and thymol iodid, to which a resin binder is added. This mixture can be made into a paste with oil of cloves or eugenol, or a setting antiseptic cement by using alcohol or chloroform as the liquid vehicle.

Prinz[16] and Aiguier[17] recommend a paste of two parts of zinc oxid and one of thymol by melting the thymol and adding the zinc oxid. This is placed in a Watson's small metal disk pulp cap

9. Marshall, John Albert, Diseases of the Teeth, Diagnosis and Treatment, 1st Edition, 1926, p. 74.
10. Grove, Carl J., Capping Vital Pulps, J. A. D. A., Sept., 1928.
11. Warner, Geo. R., Pulp Conservation, Dental Items of Interest, Vol. 49, May, 1929.
12. Netherton, E. G. and French, H. J., Pulp Conservation, Dental Digest, June, 1925.
13. Best, Elmer S., The Relation of Deep Seated Caries to Pulp Canal Involvement, J. A. D. A., Oct., 1927.
14. Barker, Paul A., Preventive Dentistry: Period of Deciduous Dentition During Transition to Permanent Dentition, Dental Digest, Vol. 67, Sept., 1925.
15. Puckley, J. P., Modern Dental Materia Medica & Pharmacology & Therapeutics, 5th Ed., 1926, p. 358.
16. Prinz, Herman, Diseases of the Soft Structure of the Teeth and Their Treatment, 1st Ed., 1928, p. 108.
17. Aiguier, James E., Dental Medicaments, Their Care, Use and Application in Every Day Practice, Dental Cosmos, Vol. 70, Mar., 1928.

and gently pressed to place over the exposure. Over this disk cement is placed to fill the cavity temporarily for several weeks before filling. These authors object to the use of eugenol, formaldehyde, zinc chlorid, phenol or other caustic agents in pulp capping because of the danger they offer in destroying the vitality of the pulp.

The above references indicate that zinc oxide or calcium phosphate are most generally used in the United States as a covering for the pulp either when nearly exposed or when actually exposed. These inorganic materials are being combined with eugenol in most cases. The antiseptic property of silver and thymol are well recognized and used quite extensively but not generally. The less irritating liquid oil of cloves might well be substituted for eugenol which would be as effective without the highly irritating properties.

In the treatment of any condition, the material used is of less consequence in the final result than the manner in which the field is prepared and the actual mechanics of the operation. Nature, after all is the great physician; and if conditions can be made more favorable for the defensive reaction of living cells by our efforts a favorable outcome will often be obtained. However we should try not to add a new burden to nature by creating an environment which in itself is a handicap to the natural forces in living tissue. Pulp reaction to pulp capping materials needs further experimental investigation to demonstrate the reaction of the living pulp to the various methods and materials used for this purpose.

SUMMARY

Pulp reaction to approaching dental caries begins as soon as the dentin becomes affected. According to Fish, as soon as the protoplasmic contents of the dentinal tubules are exposed to injury by chemical, bacterial, or mechanical influences, changes take place in the exposed tubules so that any circulation of fluids is impossible. When this occurs the affected area becomes a "dead tract" in the dentin. The pulp immediately begins to lay down a barrier of secondary dentin to cover the pulpal opening of these tubules in the dead tract, to protect itself from the irritation of the infection and decomposition products of the tubular contents.

The walling off by this deposit of secondary dentin is a normal pulp response to a pathologic condition of the dentin, and the pulp retains a normal functional capacity after such change has taken place in its housing as is shown by its histologic appearance, and by its further response to stimuli in building more secondary dentin when cavity preparation is performed, or where later areas of decay appear.

The control of dental caries depends upon the removal of softened dentin, and upon the hermetically sealing of the cavity by the filling material more than upon medication. When the cavity is hermetically sealed off from the mouth fluids by the filling, and walled off from the pulp by secondary dentin, any bacteria remaining in the dead tract between the filling and the secondary dentin becomes inert and harmless. Lateral spreading of the infection is prevented by coagulation or calcification of the

tubular contents in the surrounding tubules.

The early treatment of dental caries is most important especially in the young patient, as the size of the pulp chamber has not yet become diminished by deposits of secondary dentin and there is less calcification of dentinal tubules.

Where dental caries has approached very close to the original wall of the pulp chamber, there is usually a layer of secondary dentin intervening between the decay and the pulp, which for a time affords protection from infection. The cutting of sensitive areas uncovers living tubular protoplasm and causes more or less shock to the underlying pulp. Such areas can often be desensitized by cauterization by phenol or silver nitrate, and cut painlessly at a later time, thus preventing much of the shock to the pulp which is often followed by a pulpitis.

Successful treatment of deep dental caries is dependent upon a deposit of secondary dentin being interposed between the pulp itself and the area of irritation. After the removal of softened dentin the cavity may be disinfected with phenol, a cauterizing agent, or with a Dakin chlorine solution as a powerful germicide, that does not coagulate albumen. Pulp capping may be employed in selected cases with the hope that the pulp will tolerate the material while it builds secondary dentin over the area, but there is little experimental evidence to prove that such results are found. Clinical evidence shows that pulp capping in carefully selected cases mostly among young individuals is justified.

WHAT DOES THE TERM "FIXED BRIDGEWORK" IMPLY?*

By STANLEY D. TYLMAN, A.B., D.D.S., M.S., F.A.C.D.
Head of Crown and Bridge Department, University of Illinois, College of Dentistry

IN PRESENTING this paper, it is done with the hope that it may help those particularly interested in partial restorations in arriving at a common agreement and understanding of fundamentals.

When certain of the natural teeth are lost by caries, accident or pathologic processes, there is a local disturbance of the form, function and esthetics of the dental arches in a proportionate degree with a potential systemic derangement. What then are the means at our disposal to restore the disturbed equilibrium and to what degree may we hope for success?

The factor of esthetics while important is secondary in the restorative scheme and is usually automatically attained; this will be more fully discussed when pontics and attachments are considered. Satisfactory esthetic results may be obtained with either the fixed or the removable restorations.

Form and function are the outstanding requirements in partial restorations: not so much the form and function of the individual teeth as of the dental arches—the dental organ of mastication.

*Read before the Illinois State Dental Society, May, 1931.

The question that confronts the practitioner is—what type of partial restoration will fulfill as nearly as possible the requirements of form and function? What should be the determining factor in arriving at a decision? May we conscientiously decide on one type of bridge or another because of personal prejudices, aptitudes, or inclinations, or shall we proceed to analyze the situation as it exists and select the type best suited to meliorate the situation? There are some men who so excel in removable types of bridgework and who have such faith in its panacean virtues, that I am reminded of the village doctor who was called to attend a sick infant. He very confidently prescribed for the child, but unfortunately the child died. At the inquest the next day the coroner asked the doctor what the child died of. "I don't know," said the doctor. "But you prescribed for the child, did you not?" asked the coroner. "Yes, I gave it a certain medicine to throw it into convulsions. You see, I'm a whiz on convulsion cases."

What I wish to stress is the fact that we cannot fit the patient to our particular likes and predilections but rather we must assume the attitude of the medical man who recognizing conditions as they exist seeks to find the etiological factors involved and then select means best suited to cure and restore the affecting organs to normality.

The dental profession today is realizing more and more that in order to construct successful partial restorations, be they fixed or removable, it must think less of the individual teeth and technics as such, and more of the entire denture and its relation to the health of the patient. We appreciate more than ever before that the relations of a restoration to the human body are not only physical and mechanical but that they are also physiological or pathological.

The first duty then in every mouth placed in our care is to survey the field locally to determine the state of structural and functional deficiency and to limit the amount of systemic impairment. To do so successfully we believe that radiograms of each tooth and edentulous area should be available and that a set of full upper and lower casts be occluded and mounted; that a complete case history be obtained and a thorough clinical examination be given.

Our experience has been that those practitioners who do not take these precautions and who fail to take advantage of the results of a careful study of the case usually attain partial success only, and their patients frequently suffer irreparable damage.

We should no more think of starting restorative work without a thorough diagnostic study than an engineer would think of building a skyscraper without a complete survey and detailed specifications. We may safely accept it as an axiom that "Every edentulous space exerts a pejorative influence on the entire masticatory apparatus." To verify this statement, one need only examine the study casts and full mouth radiograms of ten consecutive mouths partially edentulous. What conditions do we find ordinarily?

First of all where a tooth or teeth have been missing for some time, we notice that the patient's chewing habits have been modified to the extent that the side of the arch having all the nat-

ural teeth has been used to a greater degree. The other side naturally falls into a state of partial disuse resulting in physical, anatomical, and physiological changes. Normal contacts are lost, teeth move mesially or distally, and in some instances those opposing edentulous spaces gravitate or rise in their sockets. We find further that a deleterious change takes place in the supporting bony tissues of those teeth where normal stresses have been reduced or entirely removed. For evidences of these changes we would refer the listener to the works of A. M. Schwarz, J. Weinmann, R. Kronfeld, and E. Kellner.

So much is being said about tissue changes in relation to the various forces exerted by the fixed or the removable bridges, that it might be proper at this time to digress slightly to consider these factors histologically.

What is the action of functional pressure upon bone? We agree that pressure causes bone resorption, but there are two kinds of pressure—continuous, such as is applied in orthodontia, and intermittent as caused by occlusal pressure. In the former we find that there is a gradual resorption of bone on one side of the tooth with a concomitant deposition of bone on the opposite. In the latter, or occlusal pressure type, we deal with an entirely different condition, for when pressure is applied, we find osteoclasts at the point of highest pressure resorbing the bone and resulting in a widening of the peridental space. When, however, the patient relaxes or opens his mouth, we find the tooth assuming its former position and new cementum and bone is laid down. The result is that the peridental space is reduced and we have an increased imbedding of Sharpey's fibers in cementum and a resultant narrower peridental membrane. The face that in these changes resulting from pressure variances we have bone resorption but no cemental resorption, is indicative of the fact that the process is not pathologic but rather a physiological one. In so far as nature is able to compensate for functional changes to that degree are we safe in placing any type of partial restoration. As further evidence of physiological response to changed stimuli, we find that the inner architecture of the bone is modified to meet the directional changes of applied forces.

The point I wish to make is this: that no matter what type of partial restoration is made, we obtain during function an intermittent pressure on the teeth. The degree of success or failure of a restoration depends entirely on the judgment exercised in the adaptation of the mechanical principles of bridgework to the biologic laws of the human body.

In our research at the University of Illinois, we have found that invariably the side subjected regularly to masticatory stresses is capable of registering a greater poundage on the gnathodynamometer than the partially edentulous side. We have found further that when the edentulous space is restored with a bridge, the poundage gradually increases over a period of time. Should not this evidence encourage us in our efforts at restorative dentistry?

At this point we might ask whether the investing soft tissues show a similar aptitude in relation to changed environment? Likewise it might be questioned whether we obtain sufficient stimulation

of these tissues under the fixed or the removable types of bridges. Are stimulating saddles essential to the health of abutment teeth and their investing tissues?

We have observed in cases of surgical gum resection that when healed the gum tissue assumed its typical form and relation in respect to the tooth; in other words there were evidences of free gingivae. Likewise in fixed bridges of several years standing we have found at our periodical examinations, evidences of similar free gingival formations of the gum tissues around the glazed porcelain pontics. We can explain these in no other way except that we have a characteristic tissue response to its normal stimulus, namely the intermittent, slight pressure of the pontic on the crest of the ridge. The tissues in these instances were not inflamed.

The more study one gives to this phase of dentistry, the more one becomes impressed with the thought that there is no one type of bridgework applicable in every instance, and that varied conditions demand different types of restorations.

In our preliminary diagnosis the question of treated teeth should be seriously considered. Should all treated teeth be condemned as bridge abutments, or are there indications for the pulpless abutment? The result of a complete case history together with the radiographic evidence pertaining to treated teeth present in the mouth will determine our decision in this respect. A patient suffering from certain systemic disturbances contraindicates root treatments; likewise radiograms showing that teeth previously treated have failed would argue against additional treatments. Yet our records show that one of every five abutments used or twenty percent are treated teeth. Furthermore, our records indicate that the failures due to treated teeth average only one percent. Do not these data encourage a tolerant attitude towards the properly treated and filled tooth?

What are the indications and the pre-requisites for fixed bridges? It is our firm belief that no bridge should be considered unless all pathologic conditions have been eradicated and the remaining teeth and investing tissues restored to a normal tone. Foci of infection, broken roots, residual necrotic areas after extraction, odontomas, and impacted or unerupted teeth are very frequently present and unrecognized. Their eradication is a distinct pre-requisite for any type of bridge.

Secondly, it is imperative that the abutment teeth be capable of withstanding the mechanical requirements of resistance and displacement; also that the root be sufficiently long and adequately supported by an alveolar process capable of withstanding the stresses to which the bridge will be subjected. The peridental membrane should be attached to the root at least two-thirds its normal length. A disregard of these anatomical conditions often leads to failure.

Another factor to be considered is the relative number of abutments and pontics. From our observations we believe that where one tooth is replaced there should be at least two abutment teeth supporting it. We might make an exception in certain cases such as restoring an upper lateral using a cuspid as the abutment. We might even restore two teeth using two abutments for supports;

but in such cases the occlusion should be normal, the patient's general health good and the physical makeup of the teeth exceptionally strong. The question might be asked, "Would you consider ever placing a three- or four-tooth bridge?" My answer to this would be, "Yes." For there are instances where such possibilities exist. A cuspid to second molar bridge in the upper arch would be admissible if for instance the opposing part of the lower denture were a tissue borne appliance. Again we have found in many instances which we have checked clinically and radiographically that a six-tooth bridge restoring four missing teeth and employing only two abutment teeth has stood up well both mechanically and biologically.

This is particularly true in the cuspid to cuspid region. We have many such cases on record. Do not misunderstand me, however, for we must select our cases carefully in these extreme type bridges. Those of us who have had experience with both types of bridgework will agree, I believe, that mechanical efficiency is obtained in proportion to the degree of stability found in the restoration. If our fixed appliances are properly selected, placed and maintained, and if they come within the orbit of nature's compensating powers, we cannot fail to agree that fixed bridges are rendering and will continue to render our patients a health service in its broadest sense.

Much has been said, and quite derogatory, at times, with reference to the bone reactions beneath pontics of fixed bridges. If I may be permitted to digress for a moment I should like at this time to make this statement. For every case which the movable removable protagonists are able to show of a normally healed and condensed bone under saddles, we are in a position to do likewise underneath properly constructed and maintained fixed bridges. Let us not confuse the issue. Gentlemen, we are not selling Nature attachments or castings, we are trying to restore in so far as it is humanly possible lost form and function.

Where failures result they are usually due to a disregard of tooth form and occlusion; absence of embrasures and interproximal areas; faulty occlusion; too long a span; weak abutments or alveolar bone and too great an emphasis on the edentulous space and too little importance attached to the fact that we are dealing with an impaired organ of the human body.

Having considered the foundation of the fixed restoration from the physiological and anatomical aspects, our attention is next drawn to the structural element of the bridge, namely; the attachments, pontics, and the means of uniting the two.

An ideal attachment must possess four qualities; it must be retentive, preventive, restorative, and esthetic. A restoration to be of any permanent value must not only replace lost form and function but it also must be so constructed that it will prevent any future damage. The old principle of extension for prevention was never any more firmly established than it is today. We do not mean by this the promiscuous cutting of tooth structure; by this principle we mean extending our margins into cleansable areas, even at the slight expense of esthetics if need be.

Too often extension has been synonymously used for deep cutting of tooth structure with the result that many pulps have been sacrificed. The first essential in the preparation of any type of cavity is that of pulp conservation. Although not opposed to treatment where necessary, we believe that every effort should be exerted to maintain a normal and vital pulp.

Furthermore in the cutting processes great care should be exercised not to injure the soft investing tissues about the tooth. Although nature will heal slight lacerations, there lurks the possibility of infection and serious involvements.

No attachment need be made stronger nor more tooth structure need be cut away than the retentive requirements of the bridge demand. If with a minimum amount of cutting we are able to get sufficient resistance to hold the bridge in place and to withstand the successive forces of mastication, why cut deeply?

Another thought occurs in connection with the preventive factor of an attachment. Research workers have recently called to our attention the fact that many degenerative processes of the pulp have their incipiency at the time abutments are prepared under anesthetics. This is due either to overheating or to the proximity of the finished cast attachment. Subsequently the pulp dies and the principle of fixation is again condemned. We have found that the preparation of a tooth under warm water without any anesthetic, save in exceptional cases, helps minimize these dangers.

The restorative requisites of an attachment are known to all of us and yet what percentage of the dental profession fulfills these precepts? Whenever we cut preparations in sound teeth we modify the natural anatomy of two or more surfaces and very frequently extend this change into the gingival region. Although great emphasis is laid on proper occlusal restoration and relationship, I believe that the greater difficulty and danger lies in the reproduction of proper axial tooth anatomy and gingival fit. We frequently modify the size and relationship of the occlusal surfaces to reduce occlusal stresses but with the axial contour we must reproduce the convexities and concavities as we find them originally in the natural teeth in order to protect the soft tissues. Slight modifications in contour are frequently necessary but generally the contour should be true to form. Occasionally grooves are deepened and supplementary ones established on the occlusal surfaces but we cannot compromise our contact points.

The factor of esthetics in bridge attachments is a highly desirable one but not essentially a pre-requisite. We find that with the types available we can have a strong and at the same time an esthetic attachment. In the posterior region this requisite plays a minor role; it is in the anterior part of the mouth that difficulties present. The two bugbears are the incisal edge and the interproximal display of metal. The latter may be greatly minimized by carefully planning the outline of our cavities and the incisal line may be eliminated almost entirely by beveling it properly to deflect the light rays downward.

Let us briefly consider some of the attachments at our disposal. The two surface inlay slightly modified has its

place in bridgework. It is generally regarded as the weakest type of attachment at our disposal. Ordinarily it is used with the semi-fixed type of restoration to support a rest. It is used with a soldered union only when the opposing arch carries a tissue borne appliance. We have found that when sufficiently dove-tailed on the occlusal or lingual, boxed on the axial, wedged at the gingival, and by having the pulpal wall lowered, we have a very useful attachment.

The three surface inlay may be used as a bridge attachment provided the tooth is sufficiently long gingivo-occlusally and the bridge does not restore more than two missing teeth. Special attention must be given the occlusal portion of these attachments. The pulpal floor should not extend as a flat surface from mesial to distal; it should be a series of planes rising and dropping as the ridges and fossae respectively are approached. Likewise to increase the strength of the attachment we should flare the enamel walls of the buccal and lingual cusps adjacent to the edentulous area so as to give us a greater bulk of gold across the region of the marginal ridge. It is possible to drop the pulpal wall slightly deeper in old patients than in younger people. It is contra-indicated in mouths that are habitually unclean and where caries is prevalent.

The third type which is used more than any other is the three-quarter attachment. Its virtue lies mainly in the fact that a maximum of retention may be obtained with the least danger to the normality of the pulp and with a minimum sacrifice of tooth structure. From an esthetic standpoint its value is greater in the posterior than in the anterior region, and yet it may be employed satisfactorily in the anterior region. From a mechanical or a retentive phase it very closely approximates the full crown. The anterior three-quarter without the incisal groove or gingival shoulder but with definite axial grooves practically parallel to each other and a sufficient bulk of gold at the cingulum, furnishes us with an ideal attachment. When used on the bicuspids and molars the direction of the axial grooves is parallel to the long axis of the tooth instead of the incisal one-third of the labial surface. As in the anterior preparations, the two axial surfaces, also the occlusal and the lingual are involved except in the lower molars where the buccal is included instead of the lingual. The three quarter is indicated in cases where the number of missing teeth exceeds two, and sometimes in the case of two teeth where the bite is exceptionally strong. Failure of this attachment is the result of too great a convergence of the axial grooves and the axial walls together with improper alloys or insufficient bulk.

Finally, just a word concerning the gold crown. There are two methods of constructing gold crowns, the correct and the incorrect. The former is done by men who have carefully studied its possibilities and its limitations and who have mastered the technic of correct preparation and construction. These men will tell you that there is still a place in dentistry for the full gold crown. They have watched, over a period of years, the successful service which these restorations have rendered without jeopardizing the health of the patient. The critics and denouncers of the gold crown, if they are sincere, base

their position and arguments on misplaced and improperly prepared and constructed crowns. Careful observation and check-up, clinically and radiographically, reveal less than one percent of failure with this crown in the hands of junior and senior students.

Although pontics may be constructed entirely of porcelain or entirely of gold, they are rather the exceptions, since the greatest percentage consists of a cast gold portion with a porcelain facing to which porcelain has been baked gingivally. A great deal of effort and study has been expended on this type of pontic until now we have a type that is permanent, hygienic and esthetic. Let us consider briefly the essentials of an ideal pontic.

The initial consideration is tooth form. It is not advisable to construct the pontic larger than the original tooth. In fact we recommend that a pontic be constructed smaller than the original tooth. The gingivo-occlusal distance and the mesio-distal distances are established but the bucco-lingual dimensions may be modified so as to reduce the occlusal strains. If an examination be made of the bucco-lingual dimensions of a natural molar or bicuspid we find that the distance between the buccal and the lingual cusp points is approximately one-half the distance through the greatest bucco-lingual diameter of that tooth. Yet how many bridges have we not seen where the distance from cusp to cusp was equal to the greatest diameter of the tooth. We immediately realize that here we have a tooth whose occlusal area has been doubled. Moreover, the cusp positions are in traumatic relation to the opposing teeth. To eliminate the possibility of any such conditions we narrow the pontics by bringing in the buccal and lingual cusps. To further reduce the strain we narrow the pontic in its lingual one-half. This not only further reduces the occlusal area but it automatically widens the embrasures so that the tissues are stimulated during mastication and the restoration is more easily kept clean.

From the contact points the pontic tapers gingivally until the porcelain comes in contact with the gum tissue. No porcelain should ever touch the tissues unless it is smooth and highly glazed. It has been shown that of all the materials at our disposal, highly glazed porcelain is most compatible with the soft tissues. In fitting the pontic we endeavor to bring it in contact with the tissues without pressure. When properly shaped and placed such a pontic does not produce inflammation, but on the contrary we find a tissue response to the extent that the gum tissue fits itself snugly around the periphery of the pontic. We have seen this condition not only in one instance but recently exhibited more than a dozen such cases.

The porcelain in these pontics may be cone shaped and have only a point contact with the tissues, or it may have a minute surface contact in the shape of a so-called saddle or ridge lap. Long cones extended into alveolar sockets immediately after extraction are not as prevalent now as they were a few years ago. We are limiting the root extension type of pontic to the anterior teeth, and then only under certain conditions. It is necessary that there be a sufficient amount of alveolar process, no danger of secondary infection, and the depth of

the porcelain extending into the socket does not exceed one-fourth the original distance. We much prefer to let sockets heal after extractions and then use the rounded tip or the modified saddle.

The tip or egg shaped type of pontic may be universally used in the lower arch. In the upper arch, due to esthetic requirements, we are frequently forced to use the saddle type. This term in a way is a misnomer for it does not saddle the ridge. It is slightly concave bucco-lingually but mesio-distally it is convex. Whatever type is used, care should be exercised not to have food locked at the gingival. This may be avoided by establishing a continuity of surface from the pontic to the adjoining gum tissues.

The question is often asked, "When do you use the stress breaker?" As the name indicates, it permits a slight degree of individual movement to the abutment teeth. To what extent therefore may be employed this principle; what are it advantages and its disadvantages?

We have always felt that where the attachments would not be subjected to maximum strains as in the average three-tooth bridge, it is better not to inhibit the natural functions of teeth. Therefore, a stress breaker is placed in the anterior abutment. When two teeth are involved as in a four-tooth bridge, a stress breaker presents greater problems. We have a choice of inhibiting this slight peridental movement by making the bridge fixed at either terminal, or we may use the stress breaker. If we do the latter, then the posterior attachment must be made stronger to resist the greater tortional strains imposed upon it. Is it possible that the leverage action upon the tooth overbalances the benefits which may accrue from the movement? In our opinion the outstanding benefit of the stress breaker lies in the fact that the bridge may be set in two parts, the first being finished before the second is inserted. The other advantage in its use occurs when one of the abutments is malposed. In this circumstance the employment of a stress breaker permits the placement of a bridge without greater sacrifice of abutment tooth structure.

Never should a stress breaker type be used when that part of the bridge extending distally of the stress breaker occludes with a tissue-borne appliance. The settling of the denture may result in the gravitation and displacement of the lug. Neither is the stress breaker indicated in four-tooth anterior bridges. We feel that nature readily compensates for slight inhibitions of tooth movement resulting from the placement of a fixed bridge.

There is one more point which I wish to discuss briefly and that is the importance and value of a systematic clinical and radiographic follow-up system for bridge restorations. We make it a practice to radiograph all cases not only before work is started but also after completion. We tabulate various clinical and radiographic data on crown-and-bridge-record envelopes which are filed. The patients are recalled at regular intervals at which time radiograms are again taken on the restored work and a careful clinical examination made. We are thus enabled to check the conditions of the pulps and the soft tissues. In addition, at the first follow-up sitting, we have an opportunity to compare

radiographically the bone changes, if any; also the peridental membrane. At this time, it is routine procedure to take another test of the poundage of the patient's bite. Any unusual or unnatural wear may be detected; also, we record the mouth hygiene and the susceptibility or immunity of the patient. We also inquire as to the general health of the patient—whether it is good, fair or poor.

One such check-up may be of some value but when we have over a thousand clinical patients returning for examinations at six month intervals for periods extending over five to ten years, it is reasonable to suppose that enough evidence presents to either uphold or reject the principle of fixed bridgework. I am pleased to state that the evidence so far does not warrant the discontinuance of fixed bridgework.

In conclusion I wish to say that no man can limit his practice exclusively to the fixed or to removable types of bridgework and render his patients the best service available, for there are indications for each type. Every partially edentulous mouth should be carefully studied and then the suitable treatment prescribed.

DISCUSSION

W. D. N. Moore, Chicago: Mr. President and Members of the Illinois State Dental Society: The essay as presented by Dr. Tylman covers the subject of replacing lost teeth by means of bridgework in a very comprehensive manner. It has been considered from a scientific and practical aspect and the paper presents much that is of value in the practice of this class of work. Due recognition is given each method of supplying missing teeth by means of bridgework with a definite recommendation that no one method can best serve all conditions, which is most commendable. To recognize conditions and know the requirements and indications of each case are the fundamental principles upon which this work should ever be undertaken. The paper recommends, and correctly so, models and radiograms as the first means of study in determining the methods and types of construction to be employed. Without these we have no safe guide of procedure.

In discussing Dr. Tylman's paper I should like to commend most highly his recommendation to consider, in the replacement of lost teeth by bridgework, the two dental arches as a whole. Clinical observation of this work has borne sufficient evidence that too much of the practice of bridgework has been simply filling spaces. Function, as advocated by the essayist, cannot accompany such methods. Your attention has been called to the conditions existing in that part of the mouth where teeth have been lost. Migration, inclination, and continued eruption of the remaining teeth in the region of the edentulous area are conditions commonly present. This part of the mouth is deformed and incapacitated. To construct and adapt a bridge to these conditions is to perpetuate deformity and lost function. Replacement should be made to stimulate the normal rather than the abnormal. Too many restorations are made to "fit" the condition of malposition, elongation, and general abnormalities rather than according to the normal functional principles of the mouth as a whole. Besides malposition of teeth adjacent to and opposing eden-

tulous spaces, with a loss of function in that part of the mouth, a predisposing cause for pathological conditions to both teeth and their surrounding tissues is always presented. Where these edentulous spaces have long remained without the replacement of artificial teeth as supplied by bridgework or some form of space retaining appliance, which is rarely practiced, a loss of one or more remaining natural teeth adjacent to the space frequently occurs. Trauma and malposition induce the loss of supporting structures that render the tooth a source of irritation and discomfort to the individual. Where these cases are of many years standing, and treatment has been delayed, irreparable loss has resulted. No example of this is more common that the sequence of injurious conditions following the loss of the first permanent molar that has been permitted to long remain without some kind of replacement. It is the writer's belief that the loss of the first permanent molar, particularly the lower, with its space not maintained, is accountable for more destructive influences to the dentition as a whole than any other one source of injury. Consequently, where damage has been general, reconstructive work must have regard for the mouth as a unit if the greatest good is to be accomplished.

Now the point is this, many times a tooth is extracted and no artificial tooth is supplied or the space retained, and the dentist excuses himself by saying he does not want to injure those sound teeth.

He probably is doing just as much injury, if not more, in allowing those teeth to drop and become malformed.

A few years ago it might have required considerable courage for any essayist to recommend the use of a pulpless tooth for an abutment for a fixed bridge; and approval of Dr. Tylman's contention in this particular is clinical experience that well filled roots, free from evidences of any pathology, will give satisfactory service in fixed bridgework.

Any discourse on the subject of fixed bridgework would necessarily imply a discussion of one of its most important parts—attachments to the abutment teeth. The work this part of the fixed bridge necessitates for its use on a sound tooth in many instances has been responsible for no replacements being made for lost natural teeth where replacements should have been made for the future welfare of the mouth. Results obtainable from the casting process have made possible the desirable requisites of form, accuracy and durability for attachments and these, together with skillful technic and good judgment in the use of the different types, should dispel the fear or distrust frequently held in this particular concerning the fixed bridge. The full gold crown properly constructed is a most useful attachment for a bridge but, with few exceptions, for reasons of esthetics its use should be confined to the molar teeth.

The so-called three-quarter crown has a place of usefulness on those teeth whose natural crowns lend themselves favorably for the necessary preparation for its reception and where the natural crown is of the average length and is not distinctly bell-shaped in form. Some exceptions have been made to the use of this form of attachment on account of the tooth cutting involved, together with the discomfort accompanying this opera-

tion, and there is some justification for this criticism.

The ravages of decay have nearly always been responsible for the loss of natural teeth. In a vast majority of these cases decay has spread to the teeth adjacent to the space and fillings frequently have already been inserted on these surfaces proximating the spaces. Here the inlay form of attachment fills the requirements in an ideal manner. By this means, in these cases, the inlay has supplied a reliable method of attachment for a bridge and left the abutment tooth fully as well protected against decay, if not better in many instances, than it had been previously. The idea should be in making an attachment for a fixed bridge to incur the minimum impairment to the abutment tooth or its pulp and at the same time provide adequate anchorage. Extreme cutting is not necessary, especially in depth. Form of cavity, rigidity of metals used, and close application to detail throughout are the chief requisites for success. In the last two weeks I examined a bridge in perfect condition supplying the only tooth missing in that mouth—a lower first permanent molar by the use of inlay attachments—that has given entire satisfaction for over twenty-four years. Such examples as this assure us that attachments can be made to teeth without involving serious injury to them. In cases of bridges replacing two or three lost teeth, and there is evidence of unusual strain, assembling attachments on two adjacent single rooted teeth has proven good practice. Now, I want you to understand me. In some mouths where there has been undue strain, and you were supplying teeth you would say from first bicuspid to second molar, with a natural supply of teeth opposing it, and there is a slight trace of loss of tissue tone around the roots of those teeth, and the movements of those teeth are the same direction, I invariably recommend a supplementing of a first bicuspid by anchorage in the cuspid. This is particularly true with those abutment teeth that show a tendency to slight instability. For example, the first bicuspid can frequently be well supported by a three surface inlay in it, assembled with an inlay in the distal surface of the cuspid. There are times when the so-called fixation in bridgework is an advantage rather than a detriment. Attachments that are made within the tooth structure offer more advantages for strength, non-irritability, insolubility of cements at margins, sanitation, and esthetic results than that type of attachment that is placed outside the tooth structure.

Time will not permit the discussion of pontics as the subject merits. There is no type of artificial tooth to be obtained commercially that fills all the requirements for an ideal pontic in a fixed bridge. The porcelain tipped pontic has its advantages of sanitation and toleration by the tissues when in contact with them, as claimed by our essayist. This type of pontic requires a gold occlusal surface, which is not as esthetic as porcelain nor is it as efficient and resistant to wearing stress. In those cases where the display of metal is a distinct disfigurement, and the space permits porcelain of sufficient length, the use of porcelain with a highly polished, hard gold adjacent to the tissues is demanded. I believe we are going to have something soon, better than gold. I think there is a combination of silver and palladium that the germicidal effect of the tissues

is going to tolerate. The ideal pontic, where space will permit, would be porcelain throughout but unfortunately such a tooth is not yet on the market.

The subject of attachments and pontics in fixed bridgework should not be dismissed without a plea for a due regard for as much esthetics in the finished bridge as the practical will permit. Too many dental bridges are made that are pronounced disfigurements to the patients wearing them. While utility is the first requirement of any reconstructive work, artistic and esthetic features should be incorporated wherever it is possible to do so. Nothing contributes more forcibly to these characteristics in dental restorations than, first, tooth form and arrangement, and second, tooth color or shade. With the facilities and methods at hand today it is possible to simulate nature to a high degree, and those principles of construction embodying the esthetic and artistic features in the replacement of missing teeth should ever be employed and maintained throughout the practical application of fixed bridgework.

The alarm aroused some years ago by focal infection caused a vast increase in the extraction of teeth and with this came an increased demand for replacement. Methods and means for doing this attracted more than ordinary interest. No department of dentistry could claim a greater variety of methods. Interest in new types of construction for restorations had been manifested almost to the exclusion of fundamental principles. The practice of this work was, for a time, a confusion of ideas. Today, the essayist, after much scientific study and practical experience in this subject, definitely expresses his approval of the fixed bridge. The fundamental principles of the fixed bridge have proven its practical application and it matters not what theories may be advanced to contraindicate its proper use, nor what exploitations of new methods be made, the day is far advanced, if indeed it ever does come, when the fixed bridge will cease to be a satisfactory means of replacing missing teeth. I want to compliment Dr. Tylman most highly upon the broad, extensive way in which he has treated his subject.

LAUGHING AT ONE'S SELF

If you can enjoy a joke on yourself, you rate the highest degree of intelligence, says Professor Gaum of Rutgers. He remarks: "Of all the degrees of laughter, the laughter at one's self ranks the highest."

Also, it must be added, it is the scarcest. Most of us have the uncomfortable suspicion that the professor is perfectly right. But history records very few jesters, philosophers, presidents, kings or what not, who enjoyed a joke on themselves.

Few ordinary people do. The only way they can bolster up their ego is to take themselves seriously. Even so wise a person as Emerson, the expounder of self-reliance, winced at any jest that punctured his dignity.

Off-hand we can only think of Diogenes, Socrates, Voltaire and Shaw as notable exceptions who could explode with glee at witticisms directed at them. They are intelligent. Of course, there are the clowns, the prime examples. But no one has accused these beloved figures of being markedly intelligent. Perhaps intelligence has nothing to do with self-laughter after all.

"MAY DAY-NATIONAL CHILD HEALTH DAY"

By GEORGE H. WANDEL, D.D.S.

"SUPPORT Your Community Child Health Program: It Protects Your Home." These are the words that are chosen as the slogan for May Day-National Child Health Day 1932. To members of the dental profession these words should act as an instant stimulus to greater efforts along child health lines. In fact, it is a professional challenge which should be taken up by every dentist in every community in the United States.

May Day-National Child Health Day is celebrated each year on the first day of May. It is the yearly focusing point for the purpose of calling to the attention of everyone the fact that in the health of its children and the protection of motherhood lies the future of the nation. On that day, all over the country, special efforts are made through talks, programs, distribution of literature, and every known device to rekindle the public interest in the problem of child health. Some communities and states even go so far as to designate a whole week for this purpose, beginning or culminating their efforts on the first day of May.

There are three points which have been selected by the May Day Committee of the State and Provincial Health Authorities of North America as necessary for emphasis this year. They are, *nutrition of children, the importance of an adequate clean and safe supply of milk, and the protection of motherhood.* These are all questions of the greatest interest to members of the dental profession.

Every dentist knows and appreciates the importance of proper nutrition for children. There is never a mention of child dental problems but that this question stands out as the most important factor. Without proper nutrition a child is almost sure to suffer tooth disturbances such as delayed eruption, caries, malocclusion, and in many instances lesions of the gums. Dentists, especially in recent years, have learned to look beyond the confines of the mouth and appreciate full well the effects of malnutrition upon the rest of the child's body. They know that general physical well-being and healthy oral structures must go hand in hand.

In our present state of economic stress, when thousands of children are undoubtedly being fed on inadequate diets, dentists should be more alert than they have ever been in checking up on the nutrition of their little patients and in offering practical advice in that respect. Considering this fact, we would call the profession's attention to a folder on emergency food relief and child health that was recently issued jointly by the United States Children's Bureau and the United States Bureau of Home Economics. In this folder emphasis is placed upon the importance of an adequate diet and upon the fact that if, only temporarily, family budgets do not seem sufficient to provide adequate diets, at least enough money should be allowed

to provide the "irreducible amounts" of protective and other foods below which it is not safe to let the diet fall, even for short periods of time. The folder outlines the minimum weekly food needs for a family of three, five, and seven, taking into consideration the presence of children. In addition, it states what these same families should eat when the diets are below the minimum requirements. Every dentist should obtain copies of it for his own enlightenment as well as for distribution where needed. Copies of this folder may be obtained without charge by writing to the United States Department of Labor, Children's Bureau, Washington, D. C. The name of it is "Emergency Food Relief and Child Health."

Taking into consideration the second point of emphasis brought out by the May Day Committee, namely, "the importance of an adequate, clean and safe supply of milk," we feel certain that every member of the profession will realize the necessity for supporting constructive efforts in that direction. It is universally accepted that milk offers the most completely acceptable nutrients for the child's diet and that it is the principal source of tooth building materials. It is also apparent that unless milk is clean and free of disease producing organisms it may prove a serious menace to child health. Therefore, dentists everywhere should align themselves with proper authorities and fight for safe milk in their communities. Especially is this stand necessary in small towns and rural communities where adequate pasteurization of milk is not usually required.

The third point mentioned for emphasis by the May Day Committee is the "protection of motherhood." Here, also, the dentist can do a great amount of good. To expectant mothers he can urge early and constant attention by a reliable physician. He can, in cooperation with the physician, advise them as to the type of diet to follow for the protection of their teeth and health and for the development of good teeth for the child. He can instruct the mother in the proper home care of her teeth and gums. And, finally, he can give her the type of dental attention that will assure the health, efficiency and comfort of her masticatory machine.

At this point it would be well to review some of the important factors to be considered in the dental care of expectant mothers.

Many expectant mothers experience an increased tendency to tooth decay and irritation of the gums. It is during the earlier period of the pregnancy that we are most apt to find this true. Mothers who are noticeably afflicted are those in whom we find digestive disturbances associated with nausea and vomiting, who show indisposition and loss of energy, who have lost weight accompanied by more or less physical deterioration, and who have neglected to take proper care of their teeth. After this disturbing period of the pregnancy is past, there is frequently a general physical improvement accompanied by a betterment of tooth and gum conditions.

Early and regular dental attention is of prime necessity to the expectant mother. Relative to the care that should be given, there are five things that are important. First, the teeth should be

thoroughly cleaned. Second, all decay should be removed and the resulting cavities filled. Third, all areas of infection should be properly taken care of either by treating or by the extraction of the teeth so involved. Fourth, any evidence of gum irritation should be properly treated. Fifth, the mother should be cautioned to return to her dentist as often as he deems it necessary to keep her mouth in a healthy condition.

We cannot emphasize too strongly the importance of locating and eliminating areas of focal infection. In this respect, x-ray examination is certainly advisable, giving special consideration to abscessed teeth, pieces of roots, pulpless teeth, teeth with large restorations, unerupted teeth and all periodontal involvements. There is strong evidence that oral infections have frequently contributed to such serious conditions as toxemia, eclampsia and abortion. Such results are most apt to occur in the case of the mother who is in a poor state of health, or has experienced a toxemia, eclampsia, or any other serious disturbance during a previous pregnancy.

Right here we wish to discourage the old-fashioned notion that it is dangerous to render dental service to an expectant mother. Obstetrical authorities advise us that most dental operations may be performed with safety but that it is not best for the expectant mother to undergo protracted and fatiguing sittings. They also state that if possible the extraction of teeth is best performed under local or conduction anesthesia rather than under some general anaesthetic. An examination of existing information strongly indicates that it is far more dangerous to neglect teeth at this time than it is to give them the necessary attention. Of course, it is taken for granted that discretion will always be exercised, and if the case calls for any serious operative procedure that the mother's physician will be called into conference.

Thus far, we have dealt largely with dentistry's May Day responsibilities from the office practice standpoint. There is another phase of our professional representation in May Day activities that might be termed "public relations." As we have previously stated, there are many communities and states that are developing comprehensive programs of activities in commemoration of this child health day. Most all of these programs call for talks on various phases of child health, but too often it is observed that dentistry is not given consideration. Also, in conjunction with these May Day programs efforts are exerted to get as many children as possible to obtain health examinations. Sometimes this is accomplished by urging parents to take their children to their family physicians, and sometimes by organizing a temporary clinic for that purpose. Here, also, it has often been observed that dentistry has not been included. Who is to blame for these failures to recognize dentistry as a part of child health service? We believe that in many instances the dental profession itself is at fault. Too often have we noted failure on the part of members of the profession to interest themselves in community health activities. They have been remiss in impressing upon the public the fact that dental care is an impor-

tant part of all health service. They have neglected to volunteer their aid in the conduct of local health programs, and if that proffer of assistance was ignored, to insist upon the right to participate. In this connection we have often heard the lame excuse offered, "We didn't participate in the program because we were not invited." Any one who is familiar with public health work knows that invitations usually come when they are sought, and frequently, that the seeking must be of a firm and persistent character. We have such professional aggressiveness in many parts of the country but there are still many localities where these things are treated with entirely too much resignation and indifference. We need a national professional alertness with a public health viewpoint today more than we ever needed it before, and one way to develop it is to give enthusiastic cooperation to such laudable movements as May Day-National Child Health Day.

There is just one other idea which the May Day Committee has brought out in its discussion of this annual child health demonstration. To be really worth while, the educational efforts expended on that day should lay the corner stone to something of a permanent nature. It should be the aim to evolve a program for child health that will make every day of the year a child health day. From a dental standpoint this offers a wonderful opportunity to pave the way for dental activities in public schools, hospitals and other public institutions dealing with children. It is an opportunity which should not be overlooked but followed up with never-ending persistence. Naturally, it is wise to work out the plans with due consideration to the other child health activities, contemplated or in existence. The important thing is to do something, always keeping that possibility of a permanent program in mind.

May Day-National Child Health Day will soon be here. May it light the way to the security of life and health of American motherhood and to the health and happiness of every American child. May the dental profession, everywhere, contribute its share toward making that day a success.

• EDITORIAL •

THE MIND OF MAN

LYING to the East of the busy downtown thoroughfare of Chicago, where the waters of Lake Michigan wash the shore of made land, there is slowly, surely rising in majesty and glory, one of man's greatest achievements, the Exposition of the Century of Progress.

The fertility of intelligent imagining and dreaming in days gone by, is no better reflected than in what is taking place before the eyes of Chicago at this time.

It was our privilege to be in a party of kindred souls recently, to visit some of the buildings, and see to the limit of our understanding, the marvelous workings of the mind of man.

To say imagination and dreaming were at work years ago is not paradoxical; for with the passing of the World's Fair, in 1893, eager minds were already planning the beautification of this very spot, and watched with much interest the widening and filling in by nature's forces, aided by man, to make Chicago's front entrance the most delectable in the world. So these visions, for such they were, are now taking tangible form and Chicago's indomitable spirit hovers over these activities like the mantle of a mother's love.

Are we concerned as to the architecture? If so, then the new ideas are a revelation that grows with a larger and closer acquaintance. Buildings without windows seem a replica of the cave. A house without place for the cheeriness of the sun's rays to enter, would be the embodiment of morbidity. And right here is where the mind of man performs the miracle, as truly so as when God said, "Let there be light." We wish to impart no irreverence in the preceding statement, but after viewing what man has accomplished there is no hesitancy in affirming that he is but expressing the Omniscience and Omnipotence of the creative mind of the Universe.

And notwithstanding the fact that some one may ridicule the thought expressed here in a dental journal of a religious belief,—thank God it still remains unalterable,—the mind of man proves the existence of Him, who commanded the stars and moon to shine at night, and the sun to light the path by day.

The illumination of these buildings, inside and out, is to be one of the most wonderful achievements of our age. Imagine, if you will, strips of aluminum, geometric designs in other materials, irregularities of surface, played upon by diffusing, and it might be said confusing lights, giving out the softening pastel shades, so restful and beautiful, and with all so ultilitarian.

The biologic and zoologic sections are being developed to a surprising accuracy, and many there will be who will have to admit, "the world do move" (evolution),

and has been doing so for many eons of time. (We really are at a loss as to the real period an "eon" represents, but should say off hand, that it must be longer than some people have been wearing artificial teeth.)

The Hall of Science building is of interest to dentistry for in it will be shown the wonders of the unbelievable. The splitting of an atom, so recently announced, will seem commonplace; the cell, tissue and plant, will be as a scroll unrolled; the activating influence of positive and negative polls will gather and expel the precipitates; man's mind is annihilating nature's mysteries. The dental section will occupy 2600 square feet in this building, and our profession can well be proud of what it will show.

The beauty of what this exposition is to be is yet in its first stages, but one can easily sense the supreme results.

Groups of people are being shown the available buildings; and if any one wishes to shake the hand of enthusiasm, a visit will produce lasting results thereby.

Finite man, encompassed in the love of an Infinite being; groping seemingly in the dark, and yet, guided unerringly to the light; yearning, persevering, accomplishing, thankfully receiving, devoutly dispensing,—mind of man.

JOINT MEETINGS

In another section of this number is a report of the Joint meeting of the Whiteside Lee County Dental Society, and the Lee County Medical Society. It is a splendid expression of co-operation, making for co-efficiency.

Too often are we inclined to draw each into his own shell and from our deep recesses hurl anathemas at one another regardless of the fact that in doing so we but more accentuate our differences. It is true that in some ways our methods of reasoning, especially concerning the retention of teeth, or their removal, the value of the X-Ray as to interpretation, the part played by teeth in systemic diseases, are very much at variance.

It is quite commonly believed by physicians bolstered up by research and clinics of international reputation, that teeth, no matter what the disease, are the first if not the only offenders: and because of this back ground of belief are sometimes hasty in ordering their removal. The dentist sensing the loss by such procedure, demands, and rightly so, a better reason than a snap judgment.

The better class of diagnosticians on both sides should be slow to condemn the teeth. And when all is said, diagnosis is virtually the sum and substance of all cures, if cure there be. When physician and dentist will meet on a common friendly ground, as many are now doing, and carefully consider the evidence, rationality will take the place of radicalism and much good accrue. But for either side to be insistent that its mode of reasoning is flawless, will do no more than provoke arguments, and rancor defeats the best intentions.

Much can be said along this line. One thing is sure the X-Ray pictures many things that are not revealed in clinical findings. For that reason alone, the physician must not let this splendid, but outraged means of disease detection be a finality. It

points out landmarks, and wise is he who knows them. The dentist must be ever mindful of a too fulsome expression of certainty.

Surely the ethics of each profession should ever be kept in mind, in order that the most interested party in this triangle, the patient, be not confused and faith thereby lost.

EXPLANATION

The May number of the JOURNAL has been delayed by reason of the proximity of the State meeting. We were desirous of including in this number some things of interest from our Annual gathering and engaged the prerogative of an editor to hold up routine. Barring the unforseen, we promise to be exacting in the future.

THE 68TH ANNUAL SESSION

It is with much satisfaction that we attest to the value of the recent Annual meeting at Springfield.

There must be something very alluring to call so many men and women to a scientific gathering in these cruel times. Of this we are sure: the urge for greater knowledge has not been submerged by gross and worrisome conditions. The ones having the burden on their shoulders for the success of the undertaking were exceedingly gratified to learn that close to seven hundred registered. And as one studied the program with its fine list of papers, thirty-one to be exact, and the splendid clinics offered, it is easy to understand the surprising attendance. The general sessions were all well attended, which shows quite a change from other times in the past.

The study class idea seems to meet the approbation of those interested, and at the low fee required should be very popular. Too much credit cannot be given the men of Springfield for the persistency with which they prepared and carried through so successfully their part.

Earnestness of purpose combined with unselfish motives, the desire to contribute for the well-being or happiness of others, strengthens self and adds to the joy of living for all concerned.

So we say to the men who gave so much of their time and ability in making up a program so comprehensive and helpful; the men who whipped into shape the splendid clinics; the local men in whatever capacity of labor, the officers of the State Society freely acknowledge their indebtedness and sincerely thank you.

Busy men always have time — to do more.

The banquet was especially honored by having as guest speaker, Dr. Harry Woodburne Chase, President of the Illinois University, who spoke on "The American Ideal in Education," a splendid address sensing the value of *true* education. Speaking along the line of present day conditions and its effect on ideals, one thought he stressed that stands out pre-eminently: "America is too fine a country to lose heart at this time."

Others who spoke were Dr. G. Walter Dittmar, President Elect of the American Dental Association, Dr. A. D. Black who portrayed in a fine way the Century of Progress Exposition in 1933, and the part Dentistry and allied professions will take. Not one of us can afford to underestimate the value of this exhibit.

Perhaps the outstanding number on this Banquet program was the tribute paid by Dr. Wm. H. G. Logan, to the members of

the State Society who have held membership for fifty years or more. Of the ten so noted, three were in attendance: Amos S. Waltz, 56 years; P. J. Kester, 51 years, and Wm. A. Johnston, 50 years. What a life time of devotion to an ideal is such a record! Dr. Logan fittingly expressed the feelings of the entire profession to these men. May their days be days of peace, far removed from the carking cares of life, and their going like as the turning of a page in a much loved book.

The presentation of the President's Plaque by Dr. E. L. Burroughs to Dr. Coolidge, retiring president, was a fine expression of esteem which was well deserved. A president in our organization has as his compensation for many days of work, worry, sleepless nights, headaches, strain and culmination of a year's work, this plaque—and the love of the men who have worked with him. We hope both have a value that words do not express.

Innovations crowded a busy four days. We who participated, sense the values, and hope that next year will offer more ease than this.

The scientific exhibits were splendidly arranged and instructive and should have more attention devoted to them. It would not be amiss to have some one on hand to explain them and make it part of the convention to so direct our members, for many a lesson is to be learned by a close study of the many interesting things.

Also we are appreciative of the many favors granted by the management of the Abraham Lincoln Hotel. Co-operation is a present day condition that works to every one's betterment.

The election resulted in the naming of:

W. I. McNeil, of Chicago,, President elect.

B. B. Beatty, Springfield, Vice-President.

New members of the Executive Council for three years:

Gail Hambleton, Chicago.
Robert Wells, Chicago.
First District, Guy F. Corly, Mattoon.
Second District, C. B. Brownell, Peoria.

The meeting place for 1933 is to be at Peoria.

The final act in the Dental drama of our Society took place, Thursday afternoon, at which time Dr. A. B. Patterson was installed, as the next president. His sense of values is such, that we feel exceptionally secure in the proper administrations of his office, and we here offer our hand and heart in this belief.

SAYS HALF OF MENTAL DISEASE CAUSED BY FOCAL INFECTION

Half of the patients in hospitals for mental disease owe their illness to definite changes in the tissues of their brains brought about by chronic infections of teeth, tonsils, sinuses or digestive tract, in the opinion of Dr. Henry A. Cotton, director of research at the New Jersey State Hospital here.

By eliminating the chronic infections in these patients, Dr. Cotton and associates were able to double the number of recoveries at the hospital during the last thirteen years. Two thousand instead of one thousand patients recovered during that period. Incidentally the State saved for at least six years $1,000 a day for the maintenance of these patients, leaving out of consideration the large amount saved in cost of construction of a new building to care for that number of patients.

Dr. Cotton began working along this line back in 1905 in Munich. At that time he found that there were definite changes in the brain in the functional disorders, which he says afflict one-half of the patients in mental disease hospitals. Still later he found that it is chronic infection which produces a poisoning that destroys the brain tissue.

In order to prevent the occurrence of mental disorders as well as many physical disorders Dr. Cotton advocates searching for and cleaning up chronic infections in children between the ages of twelve and fifteen.—Science Service.

CORRESPONDENCE

Dear Editor:

I'm in a quandary, and in order that I may give the best understanding, and hope for the best advice, I am compelled to put into this communication the facts pertaining thereto.

I know no better way to start than to say "Once upon a time," I did dental work for a man. You will notice I am writing in the past tense. There seems to be no present tense and I fear there is no future. During the time he came to my office we talked over incidents of business in the ordinary friendly way that a dentist would talk to his patient. It happened that he was a real-estate man—I believe in the hey-day of that line of endeavor they were known as *realtors*. I asked him one day as to the advisability of a real-estate transfer, not with him however, but with a tenant of mine (also past tense). The customary pros and cons were talked over, and the matter was forgotten just like when one of my short memory friends borrowed my bottle of cement liquid a year ago. (I purchased for cash a brand new bottle yesterday.)

Am I making this letter too long, Mr. Editor? You see I did not have much schooling and it takes me as long to explain myself as it does to collect my four or five accounts from my two or three patients.

Well, at any rate, time wore along, as it generally does, and the monthly jubilee was nearly at hand for "smearing the schmalz" (German for lard) in the hand of my landlord. (I fear that is not very clear.) I mean rent day was just around the corner talking to prosperity—the dog-gone fools are always doing that. The only one that comes out and shows itself is the former. I had my cook and society crasher (they are one and the same thing) send a statement to this patient advising him that four months previous I had rendered him a professional service upon which I had put the modest price (pardon me, I mean fee, I am so forgetful of the proprieties) of forty-three dollars ($43.00).

I cannot account for the time he took in answering it, but I was surely in need of financial stimulation, and naturally was somewhat nervous. Just as I licked the glue of my last postage stamp, one gloomy morning, a letter came bearing his name. When I opened it the following was spread before me.

Grand Forks, Illinois.
Jan. 14, 1932.

Dear Sir:

Your bill $43.00

Set off debit to adverse advice on your prospective trade and additional cash purchase of a mortgage on an old house made over into three apartments. Now offered for settlement at the ridiculous low sum of $13.00

Check enclosed for balance.. 30.00

$43.00

Respectfully yours,
Sorrel Mason.

Now, Mr. Editor, this is a true statement. This man was no lawyer. I did not ask him for legal advice, but only as a friend to another friend. What can I do about it? I expected that $13.00. My wife needs a new rayon dress, my children are without ear-muffs, and the ninetieth payment on my Cadillac will soon be due. And business is not so damn good neither. (Just another way of saying it's rotten.)

Fraternally yours,
Joel Ransom, Dental Surgeon.

Editor's Note:

Will some one answer this rather long letter? We will be glad to receive communications from dentists who have problems, but make it "short and snappy." We refer to dental problems. Remember this is your JOURNAL. Use it.

In Memoriam

"Life's race well run,
Life's work well done
Life's crown well won
Now comes rest."

DR. W. L. HOLLEMBEAK DIES VERY SUDDENLY

Dr. Walter L. Hollembeak of Payson who passed away suddenly at his home April 14 of heart trouble was widely known and one of the most successful dentists of Adams county.

He was born January 16, 1867, in Richfield, the son of the late Mr. and Mrs. J. W. Hollembeak. On March 1, 1900, he was united in marriage to Miss Mollie Edwards. To them were born two children—Lewis, who passed away at the age of five years and Miss Hannah Hollembeak who makes her home with her parents.

Completing his dental education at Northwestern dental school in Chicago in 1898 he established an office in Payson which he maintained until his death. He also had an office in Liberty. He joined the State Society through the Adams-Hancock Component in 1905 and was a life member.

He was a Mason, a Modern Woodman, a member of the Payson Tri-State. He was also a member of the school boards of Seymour—the grade and community high. He was a popular citizen and will be greatly missed by his associates.

DR. R. J. PADBERG

Dr. R. J. Padberg, 1233 Park Place, Quincy, Ill., prominent in fraternal and social circles, died suddenly Wednesday night at 10:25 in Turner hall while playing handball. His death occurred on the eve of his forty-eighth birthday which was to have been spent in St. Louis with his daughters, Mary Josephine and Anna May Padberg. An acute heart attack is believed to have caused his death.

Dr. Padberg was born in St. Louis on March 17, 1884, the son of Lawrence and Matilda Padberg. He was married to Miss Anna May Lubbe of Quincy, June 1, 1910, in St. Boniface Church. The widow, two daughters, Mary Josephine and Anna May, students at Maryville College of the Sacred Heart, St. Louis; five brothers, the Rev. William Padberg, S. J., member of the faculty at Marquette University, Milwaukee; Bernard of Wood River, Ill.; Lawrence, Alois and John Padberg, all of St. Louis, and two sisters, Mother Bertha Padberg, superior of Sacred Heart convent, New York, and Mother Placide of Ursuline Academy, St. Louis, survive. Dr. Padberg came to Quincy in 1917 to practice dentistry.

He was a graduate of the St. Louis Dental College. He joined the Illinois State Society through the Adams-Hancock Component in 1918.

DR. E. A. MORROW

Dr. E. A. Morrow of Washington, Illinois, died April 24th. He was born at Creighton, Missouri, December 31, 1868. He graduated from the Kansas City Dental College, and began his practice at Springfield, later moving to Washington, where he continued his professional services for thirty-five years.

Besides his wife, two brothers survive. He was active in civic affairs, a member of the Presbyterian church and associated with the Tazewell County Municipal Sanatorium at Oak Knoll.

ME

Let me be a little kinder,
Let me be a little blinder
To the faults of those about me;
Let me praise a little more;
Let me be, when I am weary,
Just a little bit more cheery;
Let me serve a little better
Those that I am striving for;
Let me be a little braver
When temptation bids me waver;
Let me strive a little harder
To be all that I should be;
Let me be a little meeker
With a brother who is weaker;
Let me think more of my neighbor,
And a little less of me.

SOCIETY ANNOUNCEMENTS

CHICAGO DENTAL SOCIETY

The scientific program for the April meeting was on the subject of Physical Therapy. Dr. John S. Coulter, of Northwestern Medical School, presented a paper on Physical Therapy in Dental Practice. Speaking of the vast number of appliances for physical therapy which are put out by various manufacturers with elaborate and frequently misleading claims as to their value, he warned against expecting too much of diathermy, infra-red or ultra-violet machines in dentistry as well as in medicine, and described the condition in which these aids if properly used may be of value.

Dr. Frank E. Simpson, Director of the Tumor Clinic of North Chicago Hospital, presented a paper, illustrated with lantern slides and motion pictures, covering treatment of benign and malignant growths with radium and X-Ray.

The annual election of officers was held at this meeting. The following officers were elected for the ensuing year:

President—Howard C. Miller.

Vice-President—D. C. Neymark.

Secretary—Stanley D. Tylman.

Treasurer—Edward J. Ryan.

Chairman, Board of Censors—Paul H. Hoeffel.

Member, Board of Censors—John J. Moran.

Member, Board of Censors—Henry A. Honoroff.

The subject of Corporate Practice was discussed at length and a motion was made that a committee be appointed to make a thorough study of this subject as it may apply to future dental practice, this committee to report back next autumn with recommendations of any action by the Society which might be desirable.

STUDY CLUB ANNOUNCEMENT

The Study Club has continued to function, about one hundred members having taken advantage of the courses offered, and six new courses will start this month. The Study Club Committee is arranging to make special courses available to men outside the city of Chicago and they would welcome correspondence with any members of the Illinois State Dental Society who would be interested in such a course. It is proposed to present classes covering a one- or two-week period making it possible for visiting dentists to combine a summer vacation with study club work. Probably one subject will be presented every morning for the period; another subject every afternoon, and a third subject every evening. This will permit of registering for one, two or three courses, as the applicant desires. Special rates will probably be arranged at convenient hotels for visitors taking these courses. Address communications to Dr. David Adams, 185 N. Wabash Avenue, Chicago, and every attempt will be made to schedule any course for which sufficient inquiries are made.

* * * * * * *

The Dental Relief Commission has been serving the indigent unemployed and about one thousand dentists have indicated their willingness to take care of such patients in their offices. The total number of patients so treated from February 29 to April 29 is 1,575.

CHARLES W. FREEMAN.

The joint meeting of Whiteside-Lee County Dental Society and Lee County Medical Society was held at Dixon State Hospital April 14, 1932.

Program

Dr. William H. G. Logan, Dean and Professor of Oral Surgery, Chicago Dental College, "Diagnosis and Treatment of the

More Common Lesions and Abnormalities of the Face, Mouth and Jaws That Are of Interest to the Dental and Medical Professions." Illustrated.

Dr. Gordon B. New, of Mayo Clinic, Professor of Rhinology, Laryngology and Stomatology, University of Minnesota Graduate School of Medicine, "Developments in Reconstructive Surgery of the Face and Neck." Illustrated.

Clinical cases presented by Dr. Warren G. Murray, Managing Officer, and members of the staff of the Dixon State Hospital.

A—Dr. H. E. Marselus, Asst. Supt., "Remarks on the Legal Status of Encephalitis Cases."

B—Dr. J. P. Krakowski, "Frohlich's Syndrome."

C—Dr. C. F. Powell, "Mongolism."

D—Dr. A. Tarnavsky, "Exhibition of Three Rare and Interesting Cases."

E—Dr. R. J. Graff, "Cretinism."

F—Dr. C. I. Daniels, Aurora, Ill., Supt. of Dental Clinics of the Illinois State Institutions, "Discussion of Vincent's Angina," with an exhibition of cases by Dr. H. C. Hart, Dixon State Hospital.

W. J. PALMER, *Pres.*
D. B. BOGAARD, *Secy.*

The regular Spring meeting of the Eastern Illinois Dental Society was held at Charleston, Illinois, April 5, 1932. Dr. Baxter, of Chicago, gave a paper and clinic on "A Simplified and Inexpensive Expansion for Gold Inlays." The next meeting will be held at Mattoon, Illinois, September 13, 1932.

I. J. NEAL, *Pres.*
W. J. GONWA, *Secy.*

WINNEBAGO COUNTY DENTAL SOCIETY

The regular monthly meeting of the Winnebago County Dental Society was held at Rockford, Illinois, April 20, 1932. Dr. Robert R. Foskett, of the Radiology Department of Northwestern University, read a paper on Radiography, together with screen pictures. The next meeting will be held at Rockford, Illinois, May 24, 1932, in conjunction with the Winnebago Medical Society.

W. M. MAGNELIA, *Secy.*

The Spring meeting of the Champaign-Danville District Dental Society was held at the Hotel Wolford, Danville, Illinois, April 14.

We were fortunate to have with us Dr. Clarence O. Simpson of St. Louis, Mo. At the afternoon session he demonstrated the technique of taking radiographs and at the evening session lectured on the interpretation of x-ray films.

Members of the Vermillion County Medical Association were the guests of the evening.

F. E. EBERT.

The regular monthly meeting of the Sangamon-Menard-Logan County Dental Society was held at Springfield April 14, 1932.

A paper, with lantern slide discussion, on "The Pathology, Diagnosis and Treatment of the Pulp with the Preparation of The Root Canals for Filling" was given by E. D. Coolidge of Chicago.

Dr. Roger House of Auburn was elected a member of the society.

The regular Spring meeting of the La Salle County Dental Society was held at Ottawa Thursday, April 7, 1932.

A paper and slides, "Radiography—Hints of Value to the General Practitioner" was given by Dr. O. M. Stewart of Chicago.

A. B. Pooley, Evans Bldg., La Salle, was elected a member of the society.

The meeting began with 6:30 dinner, followed by business meeting and lecture with slides. A short talk on membership in our society by Dr. Ralph Libberton was also given.

The next meeting will be held at Wenona, Illinois, October 6, 1932.

The regular Spring meeting of the Champaign-Danville County Dental Society was held at Danville, Illinois, April 14, 1932.

A paper on "X-Ray Technique and Diagnosis" was given by Clarence O. Simpson, M.D., D.D.S., F.A.C.D.

The next meeting will be held at Champaign, Illinois, Oct. 20, 1932.

STATE LICENSE REGISTRATION

Upon entering practise after being licensed by the State Board, each individual must register his license with the county clerk in the county in which he intends to practise. This is important.

Should a dentist fail to record his license in his county he has no legal status in an appeal to a higher court in a suit brought against a debtor for a fee and where judgment has been obtained in a Justice of Peace Court after which the debtor appeals.

This has occurred in two counties recently and investigation by a local society revealed nine out of thirty members were not registered and in two instances men who had registered many years ago had difficulty in finding their registration.

The statute of limitations in suits for malpractice permit a patient's estate one year in which to file suit; an adult patient is permitted two to five years dating from date of last service rendered, and a minor is allowed two years after he or she becomes of legal age.

These facts should be borne in mind and every member is urged to properly record his license or to see that it is on file should many years have passed since it was registered with his county clerk.

B. H. S.

PROGRAMME FOR TRAPSHOOTERS AT A. D. A. MEETING

100 target race, 16 yards; National Championship Cup, Runner-up Cup and the next three highs will get cups as well.

No cup winners will be eligible for prizes.

The silent number system for prizes which will give all classes of shooters an equal chance. The silent number system is the selection of a number and sealed in an envelope, of target breaks in each event of 25 targets, and only those breaking that number are eligible to shoot the tie off for prizes, no more no less than that sealed number.

The two high men shooting this same 100 target race from each State will compete for a two-man State team race of 100 targets to be a $5.00 per man entry, divided 40-30-20-10 per cent.

A chance for those wishing to gamble a little by betting $1.00 on each 20 targets, to run consecutively. Money divided 60-40 per cent.

A brand new stunt, which is a knockout for excitement for both shooters and spectators, will be used in the 100 target regular race as follows: 2 regular targets will be painted red and tossed some time during each event of each squad, or 8 red targets to each 100 targets. The shooter who gets the red target and breaks it will get a box of shells. Limited to two breaks.

All winners must be prepared to show paid-up membership card of the A. D. A. for 1932.

Dr. F. B. Clemmer, Editor.

Dear Dr. Clemmer: We received the March number of THE ILLINOIS DENTAL JOURNAL and I heartily congratulate you on its excellent qualities. In fact, we do not want to miss a single issue and inasmuch as you have started but recently a new volume ONE, we would like to ask you if it is possible to have the back numbers for our library.

We shall be but pleased to retaliate with any issues of *The Contact Point* you may desire and sincerely hope that our future exchange of periodicals will bring to you the same enjoyment as it does to us.

With the best wishes, I am,

Most sincerely,

INGO HACKH,
The Contact Point.

AMERICAN DENTAL ASSOCIATION

Buffalo, N. Y. **September 12-16, 1932.**

HOTEL RESERVATION

In securing hotel reservations for the 1932 Session, consult the hotel rate-sheet and fill out the blank application below. Mail immediately to the hotel you wish to patronize. The hotel will then advise you of the reservation which they make for you.

In case your first choice cannot be made kindly indicate second and third choices. If none of your choices are available the Hotel Manager will mail your application to the Chairman of Halls & Hotels Committee and he will place your reservation in as favorable a hotel as possible.

Please remember that a reservation constitutes a contract with the hotel to provide you with the accommodations you desire. If you find it impossible to carry out your part of the contract, namely, to occupy the room at the time agreed upon, please write or wire the hotel, releasing it in order that your room may be available for other members.

HOTEL	WITH BATH One Person	WITH BATH Two Persons	WITHOUT BATH One Person	WITHOUT BATH Two Persons
Arlington, 136 Exchange		$5.00		$3.00
Buffalo, Washington & Swan	$3.00 S	4.50 S		
	3.50 T&S	5.00 T&S		
	4.00 T&S	6.00 T&S		
	4.50 T&S	6.50 T&S		
		6.50 TB		
Cheltenham, 234 Franklin		3.00-5.00 TB	$1.50	
Fairfax, Delaware near North		5.00-8.00		
	Suites	10.00-12.00		
Ford, Delaware near Chippewa	2.00 S	3.50 S—$4.00 TB—S		
		4.50 S for 3 persons		
		6.00 S for 4 persons		
		7.50 S for 5 persons		
Graystone, 24 Johnson Park		3.00-5.00		
		6.00 TB		
Lafayette, Washington & Clinton	3.50	5.00-6.00		
	4.00	7.00 TB		
Lennox, 140 North	3.50	5.00-6.00 TB	2.00	3.50-4.00
Markeen, Main & Utica	3.00	5.00		3.00
	5.00	6.00 TB		4.00 TB
Statler, Niagara Square	3.50	5.50		
	4.00	6.00		
	4.50	6.50		
	5.00	7.00 TB		
	6.00	8.00 TB		
	7.00	9.00 TB—10.00 TB		
Stuyvestant, 245 Elmwood	3.00	4.00		
		Suites 5.00		
		Suites 6.50		
Touraine, Delaware & Johnson Pk	3.00	5.00		
	3.50	6.00 TB		
Westbrook, Delaware at North		Suites 6.00		
		Suites 8.50		
		Suites 9.00		
Men's Hotel, 308 Pearl (Men only)			1.00	

S—Shower; T&S—Tub and Shower; TB—Twin beds.

MAIL THIS APPLICATION DIRECT TO THE HOTEL

HOTEL RESERVATION

AMERICAN DENTAL ASSOCIATION, Buffalo, N. Y. September 12-16, 1932.

.....Hotel.
Buffalo, N. Y.

Please reserve sleeping room accommodations as noted below:

.....Room(s) With bath for ..... people. Rate desired per day $.....

.....Room(s) Without bath for ..... people. Rate desired per day $.....

Second choice hotel..... Third choice hotel.....

ROOMS TO BE OCCUPIED BY ADDRESS IN FULL

Applicant .....

.....

.....

.....

Please confirm this reservation to applicant. I further agree to notify the hotel at once in the event I am unable to use this reservation.

IMPORTANT TO HOTEL MANAGER.—In the event you cannot accept this reservation, please forward this application at once to DR. J. G. ROBERTS, CHAIRMAN HALLS & HOTELS COMMITTEE, 1839 Hotel Statler, Buffalo, New York, who will attend to the assignment of this reservation.

OFFICERS AND COMMITTEEMEN 1931—1932

EXECUTIVE COUNCIL—1931-1932

President, E. D. Coolidge.....25 East Washington Street, Chicago
President-Elect, A. B. Patterson.....406 Morris Building, Joliet
Vice-President, R. L. Graber.....608 Jefferson Building, Peoria
Secretary, B. H. Sherrard.....300 Central Trust Building, Rock Island
Treasurer, R. H. Daniels.....909 Lehmann Building, Peoria

Group No. 1

Northwestern District—Z. W. Moss, Dixon.....Term Expires 1933
Northwestern District—L. D. Head, Ottawa.....Term Expires 1934
Central District—J. S. Reece, Bloomington.....Term Expires 1932

Group No. 2

Central Western District—H. W. McMillan, Roseville.....Term Expires 1933
Central Eastern District—F. E. Ebert, Champaign.....Term Expires 1932
Southern District—M. M. Lumbattis, Mt. Vernon.....Term Expires 1934

Group No. 3—Chicago District

J. R. Blayney, 2209 Rosemont Avenue, Chicago.....Term Expires 1932
F. B. Clemmer, 1971 W. 111th Street, Chicago.....Term Expires 1932
E. Byron Kelly, 55 E. Washington Street, Chicago.....Term Expires 1933
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KNOX	J. Frank Flynn, Galesburg	M. W. Olson, Galesburg		Third Tuesday in each month except June, July and August.
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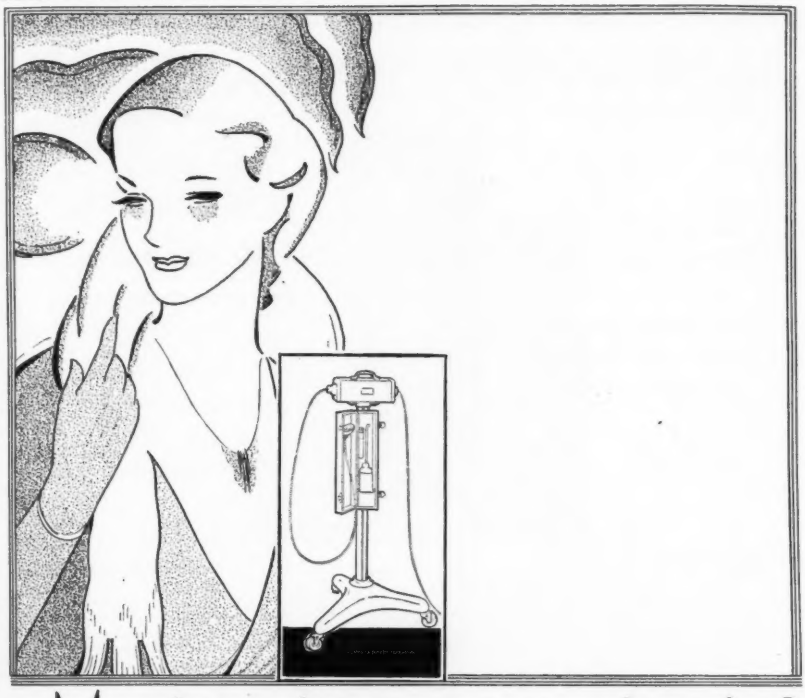
WINNEBAGO	Carlton Reed, Rockford	Wm. Magnelia, Rockford	Rockford	Second Wednesday in each month except July, August and September.



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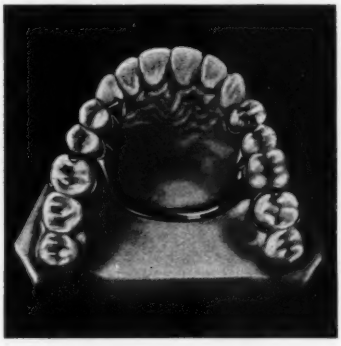

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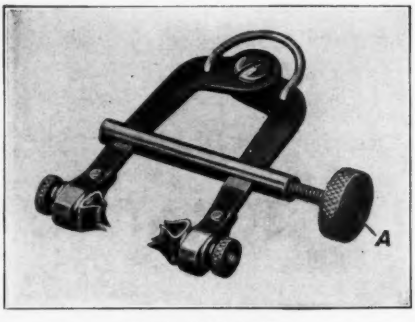

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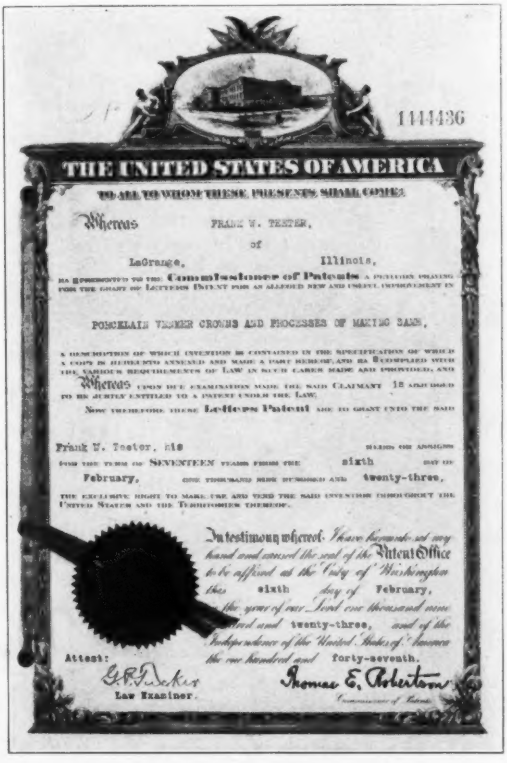

1444436

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Whereas FRANK W. TEETER,

of

LaGrange, Illinois,

has complied to the Commissioner of Patents a petition praying for the grant of Letters Patent for an alleged new and useful improvement in

PORCELAIN VENEER CROWNS AND PROCESSES OF MAKING SAME,

a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and he complied with the various requirements of law in such cases made and provided, and

Whereas upon due examination made the said Claimant is adjudged to be justly entitled to a patent under the law.

Now therefore these Letters Patent are to grant unto the said

Frank W. Teeter, his heirs or assigns for the term of Seventeen years from the sixth day of February, one thousand nine hundred and twenty-three,

the exclusive right to make, use and vend the said invention throughout the United States and the Territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington this sixth day of February, in the year of our Lord one thousand nine hundred and twenty-three, and of the Independence of the United States of America the one hundred and forty-seventh.

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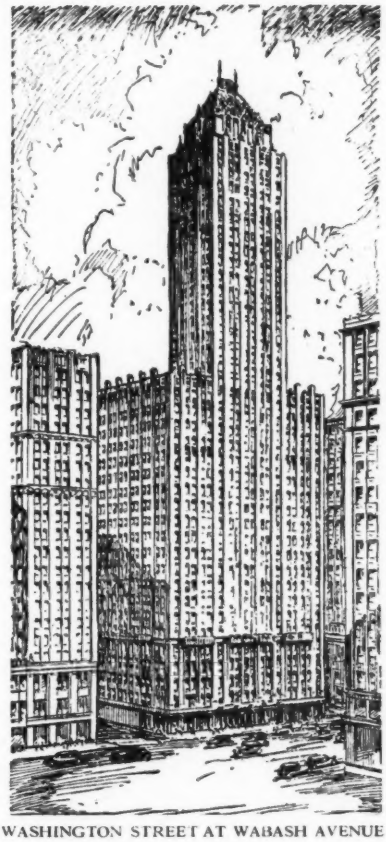

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